

# *american* **aircraft** **MODELER**

DECEMBER 1968 60c 7/-

**SKY MITE —  
AN R/C TREND**

**FULL-COLOR CENTERSPREAD**

**SPAD XIII C.1**



**Boys! Build and**

Story on page



# SUPERTIGRE ENGINES



## G-60-71 HI POWER SERIES

These engines did not develop up into the 60 size from a smaller engine. They were designed with large by-pass, heavy rod bearings and low rod angle for maximum performance. The 65 racing uses an ABC cylinder piston combo. R/C engines use one ring baffel cylinder running on a chrome sleeve.

G.60 R/C Rear Valve	\$49.98
G.60 R/C Front Valve	49.98
G.65 Racing ABC	46.98
G.71 R/C Rear Valve	49.98
G.71 R/C Front Valve	49.98



## ST-51-56-60 SERIES BEST BUY LARGE R/C

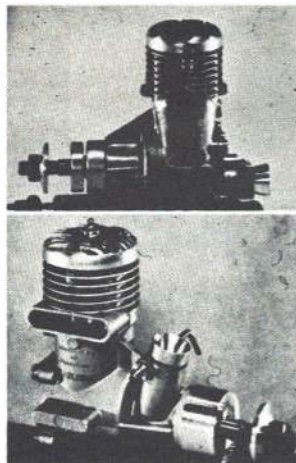
This engine is lighter than the G.60 series, these engines are proven over years of performance. Of the three in the series, the 56 is the favorite. These engines have all the custom features with good metallurgy developed through years of improvement. Compare these prices with other large R/C engines keeping in mind that they are ball-bearing engines with chromed sleeves. Maynard Hill holds his land-plane, seaplane altitude and speed records using this 60.

ST 51 R/C	\$24.98
ST 56 R/C	29.98
ST 60 R/C	34.98



## SUPERTIGRE MUFFLERS

(G.20) 15 - 19 - 23	\$ 7.98
(G.21) 29 - 35 - 40 - 46	7.98
ST 51 - 56 - 60	7.98
G.60 - 71	7.98



## G-21 COMPETITION SERIES

We have some changes to announce this time. We are going to change the G.21/35 Combat to a single ring engine. The rat race boys have done so well with the single ring, front and rear valve, that they want a similar engine for Combat. So, while we are at it, we are also going to boil up a front intake G.21/29 single ring. Also have a couple of small price increases in this series — sorry about that.

G.21/29 RV (ABC)	\$29.98
G.21/29 FV (Ring)	\$18.98
G.21/29 FI (Ring) R/C	\$24.98
G.21/35 Combat (Ring)	\$18.98
G.21/35 R/C (Ring)	\$24.98
G.21/40 FV (Ring)	\$17.98
G.21/40 FV (R/C)	\$21.98
G.21/40 RV (New) Rat	\$24.98
G.21/40 RV R/C Pylon	\$29.98



## G-20/23 FAVORITE R/C

The G.20/23 R/C is just about the most popular Supertigre engine made. A good size for a large single channel plane or a GG model like Goldberg's Falcon 56. The engine has a beautiful idle. Ball bearing, lapped piston — a quality engine that requires little maintenance. Nice for a 3 or 4 channel propo in an Andrews S-Ray. We use this for a test plane at World Engines with a semi-symmetrical airfoil. The G.20 is the series number, the 23 is the displacement. Mr. Garofali of Supertigre uses his first initial and his next number as a series number which is really a crankcase size or mold designation.

G.20/23 STD	\$13.98
G.20/23 R/C	17.98
G.20/15 FV Diesel	14.98
G.20/15 FV Diesel R/C	18.98



## G-15 RECORD SERIES

The G.15 series designates the latest configuration in Supertigre's Racing 15. This F.A.I. speed event is the international speed event and, of course, is an important competitive yardstick among engine manufacturers. Arnold Nelson placed second against a field custom engine with tuned pipes in this years U.S. F.A.I. speed eliminations in St. Louis September '67. The glow 15 and the diesel are available in front and rear configurations. The 19 in this series is a F.V. glow engine. We also stock a conversion kit for changing the front valve engines to rear valve engines. Bill Bertram holds an R/C endurance record with the F.V. Diesel of 11 hrs. 17 min. as of 12-20-67. The G.15 rear valve holds the U.S.A. Speed U/C record of 162 mph.

G.15 Speed w/spinner	\$17.98
G.15 R/V w/spinner	24.98
G.15 RV Diesel	24.98
G.19 Glow F.V.	19.98



## ST-35 ECONOMY SERIES

We are going to keep the ST 35 plain bearing engine the same as before — a flat piston lapped engine. We are changing the stunt engine to ring. The R/C version of the stunt 35 will also change to the single ring configuration. These engines are good values.

ST 35 Stunt	\$13.98
ST 35 Combat	13.98
ST 35 R/C (S)	17.98

## WORLD ENGINES CATALOG

We have a new revised 68 Catalog just printed in May '68. Eight extra pages about 20 pages revised and changed. Below — Leonardo Garofali (son of Supertigre) with German R/C flyers after they set new R/C speed record 203 mph. with G.60 ABC.



## SUPERTIGRE SPINNERS

Supertigre offers several spinners. The racing spinners are sharp nose and the R/C spinners are round nose — all are aluminum. Incidentally, the slight fly-wheel effect from a spinner aids low idle — (but too much flywheel can be used). Supertigre speed spinners are machined from bar stock for better finish and balance.

15 Speed 1 1/4" Dia.	\$ 1.75
29 Speed 1 1/4" Dia.	1.98
60 Speed 1 1/2" Dia.	2.50
1/4" Shaft 2 1/4" Dia.	3.49

\*Fits any 1/4" Shaft Engine

## LATEST SUPERTIGRE NEWS

At this writing we do not have the official National results. The information contained in this copy was picked up from John Kilsdonk's newsletter that he issued after his return from the Nationals. Supertigre engines really cleaned up this year in U-Control events. In open "C" Speed, the first two places used G.65s with iron pistons and third place was taken by ABC G.65. Space does not permit the mentioning of all the names in the teams that were competing in Speed. In open "B" Speed, rear valve Tigre 29s took 1st, 2nd, and 3rd place. In Proto, Glenn Lee won with 148.3 mph with a Tigre and Howard Weaver was second with a Tigre. Howard Weaver also won rat race using a G.21-40 RV Tigre and Ro-Go fuel. It is interesting to note that Tim Zimmerman also using a Super Tigre won the Junior rat race event and turned a time faster than either Senior or Open.

There has been a lot of activity this year in radio control Speed. Tigres were used to establish some over 200 mph records in Germany early this year. There has been quite a bit of activity around Washington when Lt. Cmdr. Ernie Greene and Maynard Hill and others have been working on some R/C Speed records. Ernie Greene reports that he was able to handle his Supertigre G-65 powered Speed model using a throttle. On his last flight he replaced a throttle with a straight large venturi. He made it through the traps going one way at around 220 mph and then lost control of the model which ended up buried in a large tree root. This was after about a 4000 ft. dive straight in. We understand that Maynard Hill is the new Speed record holder, however, we do not have his time yet.

Just last week, we understand, a Mr. Wistner won the WW1 Scale event at Rhinebeck, New York using either a Tigre 51 or 56 and also using one of the older vintage Controlaire Propos.

Here at World Engines we have openings for Electronic Technicians. We are trying to get our service work up to a one or two day turn around time. If interested, call the writer, John Maloney, 793-5900.



# WORLD ENGINES

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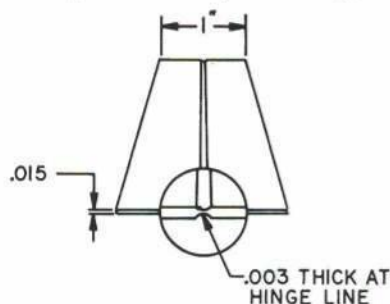
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# american aircraft MODELER

VOLUME 67, NUMBER 6

DECEMBER 1968

**COVER PHOTO:** The new trend to smaller full-house ships is evident in Frank Pierce color photo of Jerry Hibbard and his 52-in. Sky Mite, powered by a Super Tigre 23.

**WILLIAM J. WINTER — EDITOR AND PUBLISHER**

Edward C. Sweeney, Jr., Associate Editor

Harry E. Harps, Assistant Editor

Sally Barry, Production Editor

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## STRAIGHT AND LEVEL



### Last winter Navy threatened to drop the Nationals. Now the future is rosy. Here's what happened....

WILL 1968 be the last of the Navy-hosted Nationals, we had asked in opening the March-issue editorial. The question requires an answer. The answer is an emphatic no. Between the January-February period in which the March issue reached the public, and Nats time at Olathe, Kan., a few people moved Heaven and earth to avoid the collapse of a 20-year-old relationship which had once done so much for both the Navy and model aviation.

The problem, you will recall, was that the Nats increasingly was failing to achieve original goals established by both AMA and Navy. Not only were kids as scarce as hen's teeth, but the age-level figure had vanished into the stratosphere. A few months back, even a wild optimist would not have given a plugged nickel for our chances. What happened?

Ending that March editorial, we had predicted that a silly little stick model called the Delta Dart might save the day. Darned if it didn't! What was unexpected was a magnificent bonus resulting from the resurgence of youth activity generally, and that must be credited to all those older, adult hobbyists who finally took to heart the essential fact that kids simply are not born as expert, active modelers. They did really need help. Getting it, they seemed to appear out of nowhere.

When the dust had settled at Olathe, the breakdown of contestants revealed some amazing things. For openers, consider that the number of contestants less than 21 years of age almost doubled the 1967 figure. In Junior and Senior classes, 378 competed! Juniors invaded almost every event. One even placed within the first 20 in R/C pylon racing. As a matter of fact, the Juniors were strong in R/C—something editorialists said was impossible.

The big deal, the earth-shaker, was the howling success of the special Delta Dart competition held for kids. It took place in a well-removed building, almost a Nats within a Nats, and you'd hardly know it was going on. History was being made. Seven-hundred kids showed up—even though the Naval Air Station is 30 miles from Kansas City. And that meant that parents went along, watched, and were pleased. Where did the influx come from? Why?

There were two pre-meet programs. AMA, Navy, and the Hobby Industry of America co-operated effectively to prove what promotion can do. The results verify the truly tremendous possibilities of a real, national promotion—if we don't lose momentum. One of these programs was an AMA-HIAA-Navy cooperative calling for some 12 key-area regional Delta Dart eliminations, winners being sent expenses-paid to Olathe. The other, involving AMA-Navy teamwork in the Kansas City area before the big meet, was a revelation.

For a week just prior to the Nats, local radio and TV stations advised kids that free Delta Darts were to be had

at shopping centers. At each of the participating centers, a Navy representative was on hand to greet the youngsters. Some 18,000 kits were given out—and, incidentally over 50,000 Delta Dart kits have now been produced. All the kids had to do was put the thing together, and get to Olathe. That so many of them managed has now inspired all the organizations involved, to look forward to bigger and better things.

Within a few months, gloom has turned to optimism. Navy has eloquently expressed its satisfaction. The next Nats is set for Willow Grove near Philly. And the word is, that with a workable emphasis on youth, there are no foreseeable limitations.

Navy had another serious beef, which was the fantastic number of personnel required during the Nats week. Important Station activity was seriously curtailed. That problem was eased by an AMA membership willingness to get in there and work, even if it meant no flying, or fun, for many people who had looked forward all year to attending that Nats. The reduction in required Navy personnel that resulted played a vital part in assuring bigger, and better, future Nats and programs. In Indoors, for example, the event-operating personnel, was 100% AMA!

Reporting these glad tidings, it is important to note the corresponding growth in numbers, and effectiveness, of the AMA organization. For the second year in a row, AMA has broken all previous records. With a total of over 25,000, sights have been set on 30,000 in a year or two, and expanded, promising programs are in sight, thanks to the growing base.

Three years ago, AMA had 120 charter clubs. Today, the number stands at 450, affecting 10,000, or 40%, of the total membership. The two biggest factors in this membership growth are the AMA liability insurance program, protecting individual members, and the inclusion in membership benefits of a monthly magazine.

With this issue, eight pages have been added to the magazine to permit expansion of the Model Aviation section to eight pages which, in turn, will encourage presentation of more material for organization members.

The Long Flight, a 16mm half-hour color sound film designed to promote interest in Model Aviation, is one of the finest things of its kind to come along in years. It is a major promotion tool which, if properly exploited, could yield a fine harvest of future modelers. It was produced by Franck Films, 22 Hillcrest Circle, Watertown, Mass. 02172 (Phone 924-4529).

It has long been Franck's philosophy that today's beginners do not need easier models to build, but the inspiration to build "hard" ones. Once, models flew in that big field down at the end of your street. Just watch-

*Continued on page 58*



# What's New

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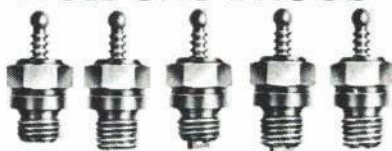
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## A second time on earth?

Your magazine is interesting and beautifully done. When my second round on earth comes about, I'd enjoy being a boy with lots of balsa wood!

**Stella Randolph, Rockville, Md.**

Stella Randolph is a lively little lady with a twinkle in her eye, an aviation buff for many years. She had lots to do with Gustav Whitehead getting his day in our November article on page 14. When we told her how much we enjoyed her letter, a later response included the following statement:

"Your letter of the 19th gave me a laugh. Of course you are free to quote me on the plans for reincarnation, and I promise not to haunt you for it." Ed.

## Critics don't bug us

Finished reading your Editorial in the September issue with considerable interest. We have truly developed some great (?) critics, not only of editors, but of everything else imaginable.

I think . . . is most fortunate to have a man on their staff who can not only design proportional and tell others how to build it, but can also comment on the type of paper others are printing their magazine on. Don't go back to the old paper because of this!

I have one very active flyer who refuses to belong to our local club because we are AMA and he says that their free magazine is "no good," yet he goes downtown and buys it every month for \$7.20 per year.

Keep up the good work and don't let the critics bug you.

**Clark Besancon, Editor, Propbusters  
Newsletter, Rapid City, S. Dak.**

## Another McEntee fan

I would like to comment on one of your staff members, Howard McEntee. His "Radio Control World," and "Getting Started in R/C," are clear and understandable. I also have his R/C Primer which was a great help to me. I think A.A.M. deserves a big hand for their articles, illustrations and comments.

**Alan G. Zawlocki, Silver Spring, Md.**

Thanks a million, Alan! We made a book out of "Getting Started." See page 76. Ed.

## More rocketry

I like your magazine very much, but I do not think it's very open-minded. The title of your magazine implies that it is concerned with *all* model aircraft, but it does not have nearly enough coverage of model rocketry, a very important part of model aviation. I know that I and many other model rocketeers would appreciate it if you would give equal space and articles on designs of rockets to our hobby, as you give to other parts of model aviation.

Give my thanks to Capt. Ronald Van Putte for his fine article on canards, as it

lends itself readily to a radio-controlled boost-glider.

**Peter H. Helmers, Florham Park, N. J.**

Although Countdown has been discontinued as a column, Harry Stine has been invited to submit rocketry articles and plans, as have other qualified NAR members. The magazine needs good projects — but it is up to the rocketeers themselves to produce publishable things, just as do the airplane boys. Ed.

## Canberra man needs help

I spent 18 months overseas in the Air Force and a large amount of this time at DaNang RVN. I was crew chief with the 13th Bomb Sq. and we flew the B57 Canberra. A very fine aircraft with an outstanding record in Vietnam. The book "Doom Pussy," by Elaine Shepard, shows a small part of what it can do.

I would like to know if there is anyone in this country who has ever made a model, kit, plans — or knows anything about this aircraft. I would like to build a good scale model. If you could help in any way, I would be very grateful.

**Daniel L. Hill, Muskogee, Okla.**

Letters from any readers who can help Dan, will be forwarded to him. Ed.

## It's a small world

Back when one could buy a kit from the Comet Co. for \$1 and come out with a plane with a wingspan of no less than 36", I was a young boy saving pennies to build these Comet kits from the 10-cent-size up. The last model I built was a Cleveland kit, 36" span, of the Fairchild PT-19. But something was lacking. The fulfillment I once gained from building models was not complete. I could not fly in my models.

So, I quit building models, and gave my model magazine collection away.

Eight years passed after the PT-19, to May, 1967, before I found the model with that certain something the others lacked. I could sit in it.

The model was a lifesize 1939 Porterfield Collegiate, CP-50 with upstack exhaust system, Ser. #581, Lic. #NC 25401. It sat in a field in the Northwest, behind a house, rotting and rusting. The price was reasonable. I took the challenge of restoring her to as close as she looked in Sept. 24, 1939, the day she rolled off the assembly line in Kansas City, Kan. She was a mess, with most woodwork rotted beyond pattern material. I traveled all over the Northwest looking for a sistership hoping to gain needed info and measurements for rebuilding. Except for an old-timer here and there, everyone would look at me with a blank face and state, "Porterfield? Never heard of it."

Well, I found two: N 25535 and N 34744. But as both were flying and vital areas covered, I gained little more than pictures.

Luckily, I was able to restore wings, but fuselage woodwork had to be from pictures to line of sight, to cardboard templates, to more lines, to end product.

Then what happens? Just short of stringing cables, covering fuselage and passing inspection for flight, I pick up A.A.M. just to see what the modelers are doing, and lo and behold, you feature the Porterfield Collegiate!

You show sketches of a Collegiate bearing a lic. # only 52 planes later than mine. Then, at the end of the article, you tell me the June issue featured drawings with adequate info for true-to-scale model. On top of that you tell me how my Porterfield is



Your article is great! After nine years of shuteye, I will not fail to check your magazine monthly for further articles of interest.

Many modelers go in for home-built and antique airplanes. You sit in them—that's the difference! Ed.

Congratulations to A.A.M. I think I speak for a large proportion of modelers, who do not over-emphasize any particular category, who may not ever enter a contest, but who build and fly for fun.

Although we may have our favorite areas of interest, we like to read and learn about *all* phases of modeling. Your approach toward a broad category mix is welcome. Those centerspreads are beautiful.

This is just to let you know there are still a lot of us free-flyters around. The South-Western Ohio Free-Flyters club is devoted exclusively to free-flight.

Five years ago, I thought free-flight in the Cincinnati area was dead, but with a little effort, we were able to round up about a dozen serious modelers and form a club. We're having lots of fun with our favorite phase of the hobby.

We have a control-line club in Quebec City, Canada, the Quebec Mini Aero Club. You will see by the enclosed picture that our members can work on plans. Our president, Mr. André Huot, has built up this Neutrino from your plans last winter, but put a bellcrank instead of a radio system.

The Neutrino flies well, but due to its volume, it is not so easy to stunt.

I just picked up the February issue of your magazine. I read your Editorial, "Straight and Level." Well, I am 14 years old and I am extremely interested in R/C planes. It said that for every two boys interested in model planes, one preferred rock collecting. The age group mentioned was 12-15.

Do you want to know why so few young teens are interested? It cost too much damn money. I am also interested in electronics, so I know that the prices of radio-control equipment are reasonable and that it just isn't an expensive mystery toy. But you must understand that the magic age concerning money is 16. I've been looking all over the place for a summer job. There is an unlimited supply of jobs as bus boys, dishwashers, porters, etc. I go in one of the many restaurants and ask for a job. They say fine, we need lots of them. "How old are you?"

"Fourteen," I tell them.

"Oh, I'm sorry. We don't hire anyone

[illegible]



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learn to fly a helicopter. I have been active in C/L for many years. Due to the influence of your publication, I have now entered the R/C field by way of a used six-channel reed unit. The result is that I am even more delighted to be able to read one well-balanced publication instead of having to search for material on both C/L and R/C. I feel that a good balance is the most important factor to the success of American Aircraft Modeler.

I do wish to thank Howard McEntee for his articles "Getting Started in R/C."

All I wish to say is thanks for a great magazine.

Collie E. Ortle, Fort Wolters, Tex.

### Three-views forever

I want to compliment you on the fine magazine you are putting out now, especially the last four or five issues.

I like all the fine three-view drawings by Paul Matt and Karlstrom and hope every issue has lots of them.

The ones in color are excellent. I think your magazine tops them all.

Donald Kirkpatrick, East Hartford, Conn.

We could not agree more — natch. By the way, thousands of people collect three-views, so they are an important part of pleasing our public. Ed.

### Found the needle?

The August issue is the best yet. Perhaps the thing that appeals to me the most is the balance of aviation history which has been introduced to supplement your modeling material, which in itself has always been first class. Please continue the colored three-view covers. They're not only unique, but well worth collecting in themselves. The same goes for the center-spread idea.

Paul Matt and Don Pratt have also been doing a creditable job. Your Editorials are basic, sound, and straight from the shoulder.

The modeling game needs a shot in the arm and I think you've come closer than anyone to finding the needle.

John Houser, Middletown, Ohio

### Is Navy giving a fair shake?

Just read your editorial in the March issue and I must say it was well-written and to the point. I must agree with you on all aspects but one, and maybe you can clear the dew on that one.

You said that one of the objectives for the Nationals was to encourage the interest of the nation's youth and more specifically the aircraft model enthusiast in the U.S. Navy. That was the impression I had been under for years and I am part of that great Navy and have been for almost 15 years. But I have never seen it in black and white.

I wanted to enter the Nats in 1965, but the Navy would not give me leave, which I had earned from the previous year, and it was not a question of manpower — there were many men to replace me. The U.S. Air Force sends a team every year to a Navy-sponsored contest, but does the Navy get a team up? No. I don't think it's fair when other teams such as rifle teams, bowling teams, golf teams get to go all over the U.S. for competition Navy-wide all year round, but no team to the Nats and it's only once a year. I'm hoping you'll publish this letter in your magazine. Maybe some top brass R/C flyer will read and start something rolling, as long as it's not my head.

It seems as though the Navy isn't giving its own a fair shake.

Roger B. Barrett, USS Ticonderoga

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# HI-CLIMBER

STU RICHMOND

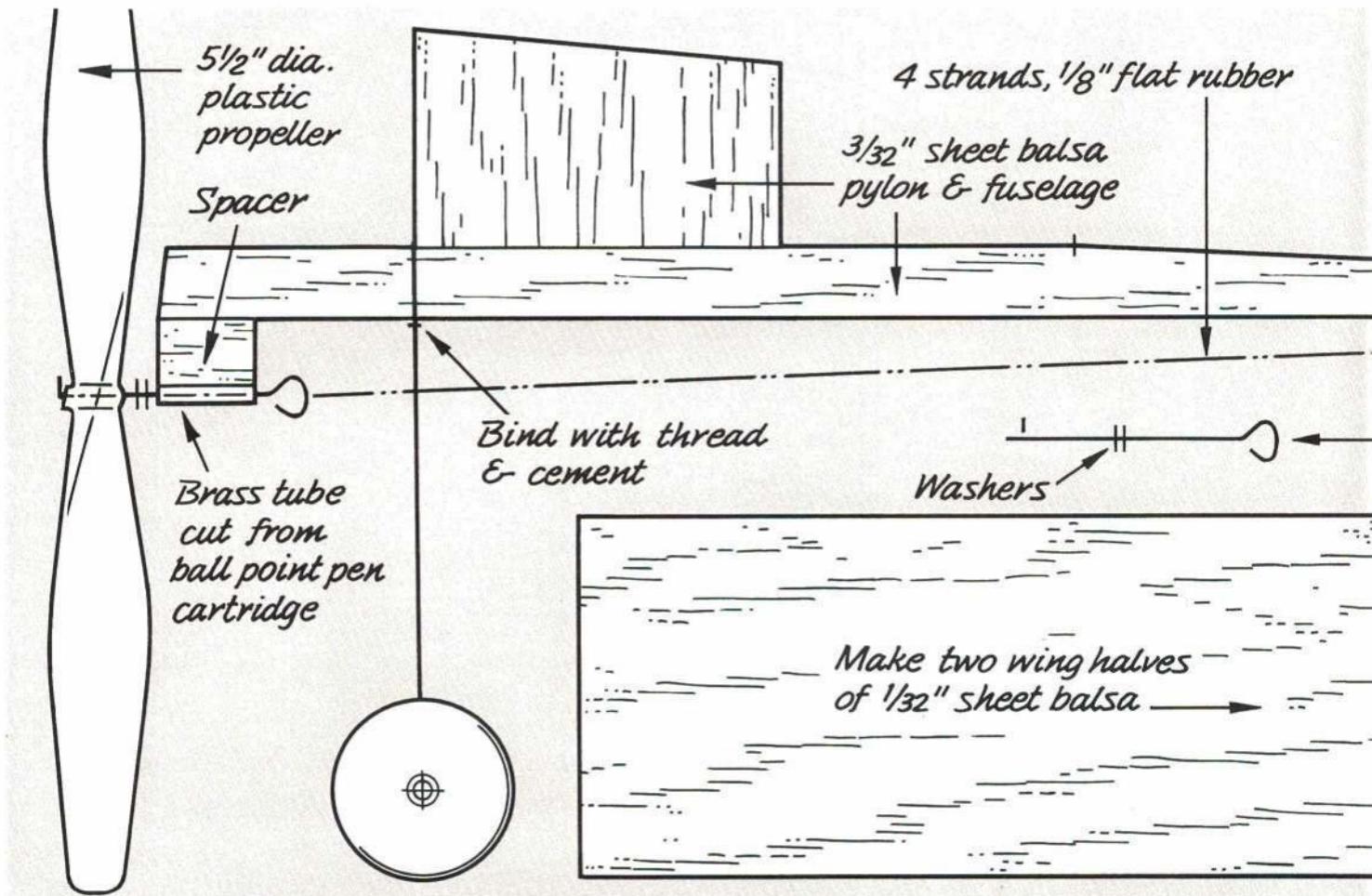
HERE'S a little cutie that really flies! It builds quickly and has almost no critical dimensions. It's designed like a contest model. And it flies like one! Plans are full size as they appear in this magazine.

A few suggestions will help you get best

results. Make sure you use stiff, warp-free wood for the wings and tail parts. The propeller and wheels, along with wire parts may be had from the local hobby shop, or from some ready-to-fly models costing about 25c. Any plastic prop near  $5\frac{1}{2}$  inches

in diameter will do. They are easy to find.

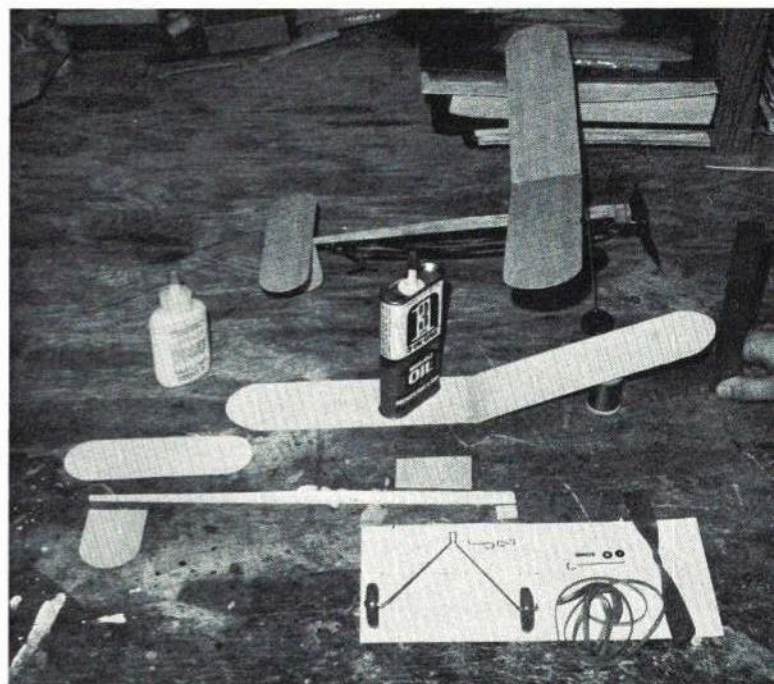
Study the pictures, tool list and materials list carefully before you start. Putting maximum winds to the motor by stretch winding will take some help from a friend, but flights will be about twice as long if







Everything you need, both in materials and tools. Razor saw is a help, but is not essential. Use of winder described in article.



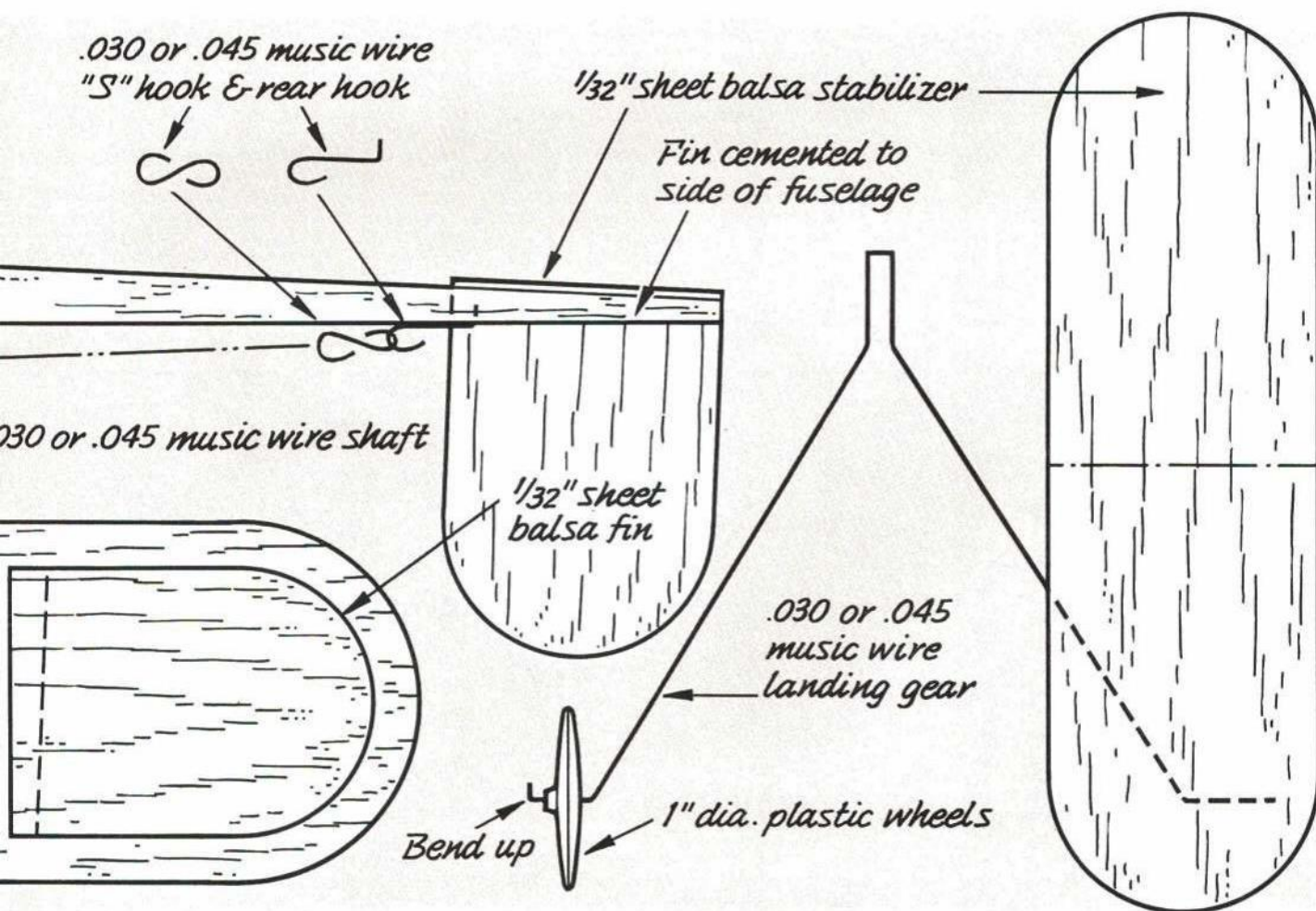
Parts have been cut out, landing gear bent to shape. Important to note is simple method for putting the dihedral in the wing.

you use a mechanical winder, or a hand drill with a hook in it. If you use a hand drill, put a slight bend in the hook where it fits inside the drill and get it tightened well so it won't pull out and cause an accident to your helper or the Hi-Climber.

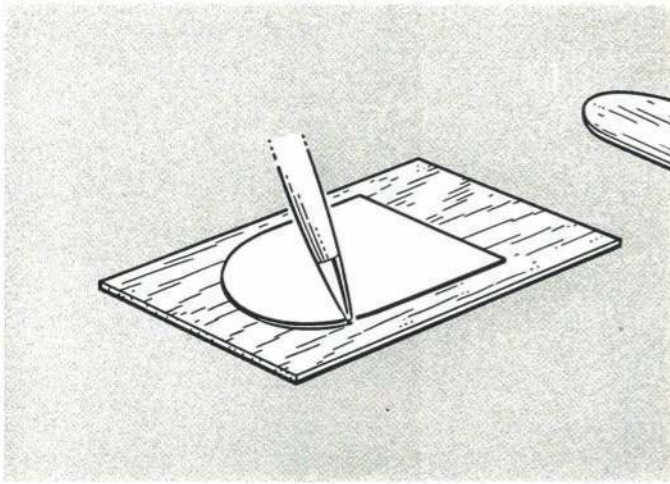
You can add clay or chewing gum under a wingtip to control turns, as well as to the nose (if model stalls) or tail (if model dives) as necessary. All models built and shown in the pictures have required no such weight additions. You can experiment

by moistening lightly the rear of the rudder and bending it to either side to control the turns.

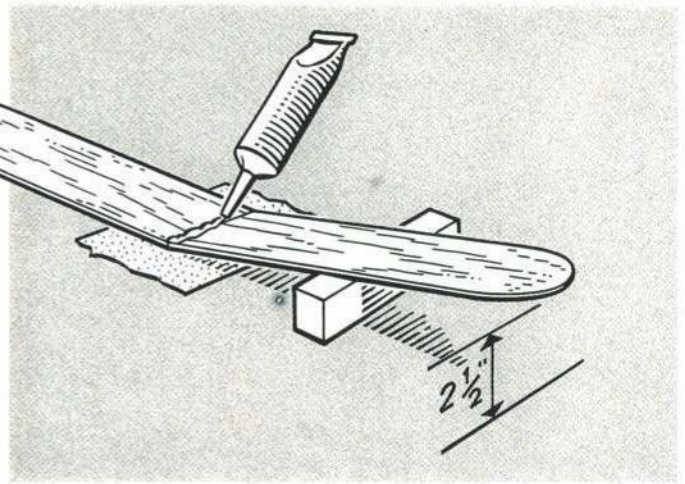
If you wish to experiment further after building your Hi-Climber, follow step #20 and build one-half again bigger.







1. Trace paper patterns with carbon paper. Trace around patterns onto balsa sheet using ballpoint pen. Lines are easily seen.



2. Prop one wing half up so tip is elevated  $2\frac{1}{2}$ " for dihedral. Cement halves together, using wax paper to prevent sticking to work board. When picked up, be sure bottom is dry.

**Step 1:** Make patterns of all balsa parts by putting tracing paper over the plans, or carbon paper and a sheet of white paper under the plans. Trace the outlines and cut out the patterns.

**Step 2:** With a ballpoint pen, trace around the patterns lightly onto the balsa wood.

**Step 3:** Cut out the balsa parts using a ruler where needed to cut straight edges.

**Step 4:** Sand all parts smooth and round except where parts join together.

**Step 5:** Bend all wire parts to shape as shown on plans. Get help if needed. Put on wheels.

**Step 6:** Glue wings together by putting one wing flat on the work bench and raising the other tip up  $2\frac{1}{2}$  inches. Use wax paper under wing joint to prevent wing from being glued to bench. This forms the proper dihedral angle and makes the Hi-Climber stable in the air. Let this glued joint dry overnight, or at least until thoroughly dry.

**Step 7:** Use a pin to make the hole for rear hook to fit bottom of fuselage. Push rear hook into fuselage and wrap joint with thread. Coat joint lightly with glue.

**Step 8:** Cut  $\frac{1}{2}$ " length of metal tubing and glue it and spacer block to bottom front of fuselage. Wrap with thread and coat heavily with glue. If available, use epoxy glue on the nose rather than white glue (such as Elmer's).

**Step 9:** Glue pylon onto fuselage and allow to dry. Make sure high side is forward toward propeller.

**Step 10:** Put landing gear in fuselage, wrap with thread and coat with glue.

**Step 11:** Glue stabilizer on top rear of fuselage. Use pins to hold temporarily if needed.

**Step 12:** Glue rudder on either side of fuselage and against bottom side of stabilizer.

**Step 13:** Glue wing on top of pylon. Use pins temporarily to hold in place if needed. Make sure all parts line-up when viewed from top, front and rear, and let the Hi-Climber dry thoroughly.

**Step 14:** Put propeller shaft through metal tubing, put on two or three thrust washers, put on propeller and bend end of wire to keep propeller on the shaft. Put one drop of oil on the washers only.

**Step 15:** Lubricate the motor lightly with liquid hair shampoo or with rubber lubricant and hook in position. (Or melt a little margarine — not butter — in palm of hand.) Don't use oil on the rubber. Measure  $3\frac{1}{2}$ " of  $\frac{1}{8}$ " rubber, tie the ends together and double the loop to make 4 strands.

**Step 16:** Wind about 50 turns into the motor (don't wind backward; turn prop to right as you face front) and launch with a gentle push into the wind with the nose pointed slightly up. If the model turns too

tightly to the right, moisten and turn the rear of the rudder to the left (as viewed from the rear).

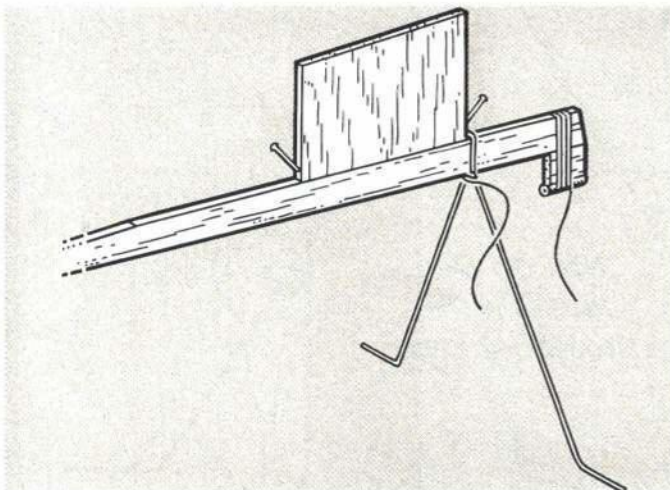
**Step 17:** The model should circle to the right and climb high under power. In the glide it should turn to the left or possibly glide straight.

**Step 18:** Maximum winds are put in by following the picture which shows the model held upside down by the propeller while another person stretches the motor three times its normal length and begins winding while slowly advancing forward until normal motor length is reached. With practice, 250 winds of the motor are possible every time. This may only be 40 to 60 turns of your winder. See how many winds each turn of the handle twists into the rubber motor.

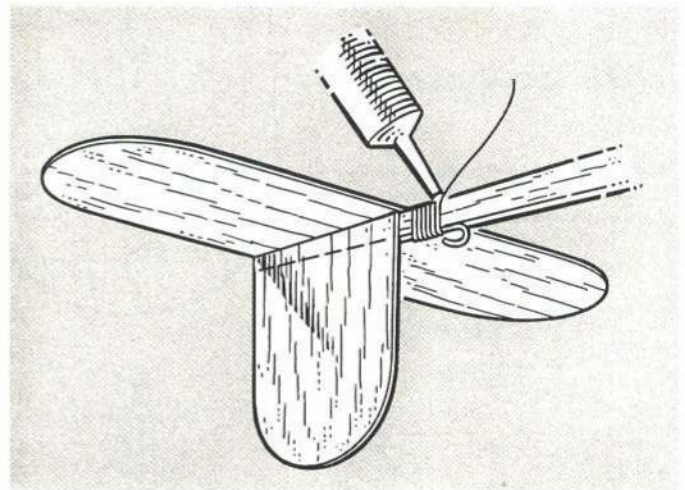
**Step 19:** Fly the Hi-Climber away from trees and houses. It really goes! Your schoolyard makes a fine flying field. Use the ballpoint pen to put your name, address, and telephone number on the bottom of the wing for safety.

**Step 20:** You may wish to make a larger Hi-Climber by using wood twice as thick and making all parts half again larger than these plans. Be sure to keep the angle between the top and bottom of the pylon the same, as this is the only critical part.

**Step 21:** Happy flying on calm days. Be patient if wind is blowing.

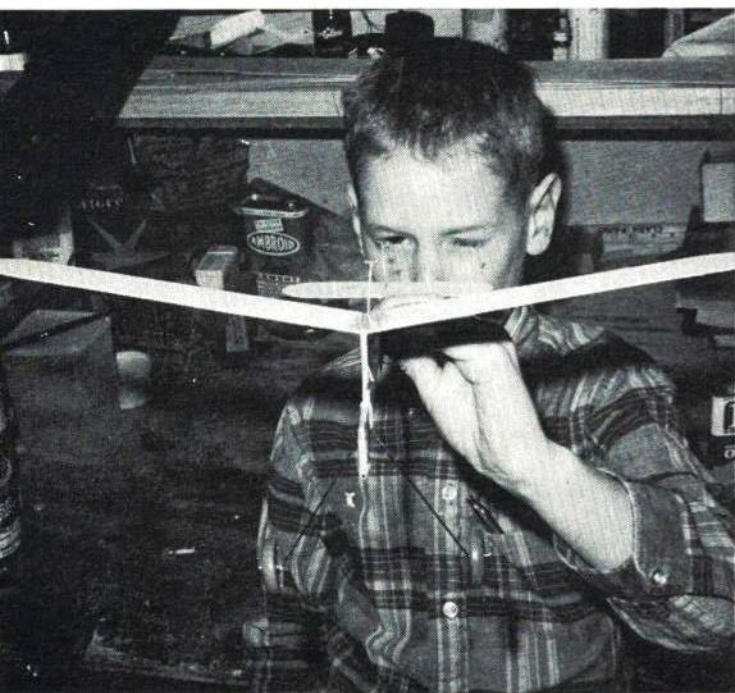


3. Cement wing pylon to motorstick, pinning it while cement hardens. Bind with thread and cement landing gear, spacer and thrust tube in place. It does not pay to hurry your work.



4. Bind and cement rear hook in position. Cement fin to side of motorstick. Make sure it is on straight as cement dries.





An important part of building a flying model is checking out the alignment of flying surfaces. Should not be crooked — no warps!



The secret of long, long flights. Use an escapement winder, or a drill with hook. Stretch rubber, wind and slowly walk it in.

#### TOOLS

Modeling knife or single-edge razor blade for cutting.  
 Ruler (a metal one would be best).  
 Very smooth sandpaper (#500 or #400 if possible).  
 Needle-nose pliers (for wire bending).  
 Small hacksaw (to cut tubing).  
 Pencil or ballpoint pen and carbon paper for tracing outline of balsa parts onto balsa wood.  
 A few straight, steel pins.  
 A sheet of tracing paper or carbon paper.

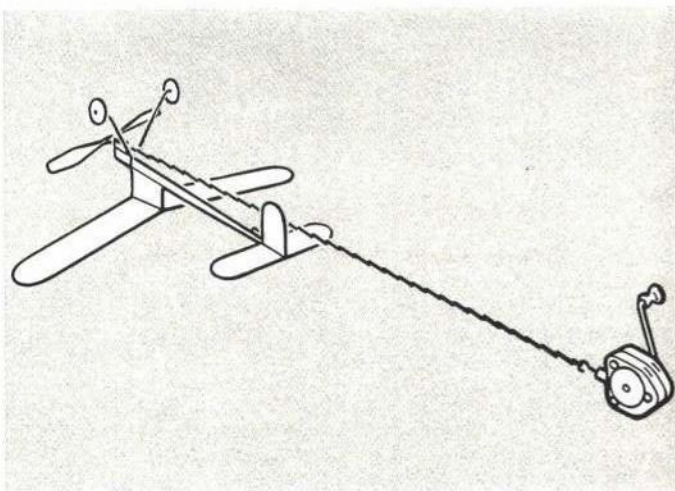
#### MATERIALS

One sheet  $\frac{1}{32} \times 2 \times 36''$  balsa. Must be stiff and flat. If not available, use soft, flat  $\frac{1}{16} \times 2 \times 36''$ .  
 One sheet  $\frac{1}{32} \times 2 \times 36''$  very hard balsa for fuselage;  $\frac{1}{8}''$  thick wood may be substituted.  
 One piece .030 or .045 piano wire for landing gear and hooks.  
 Two plastic wheels — about 1" in diameter.

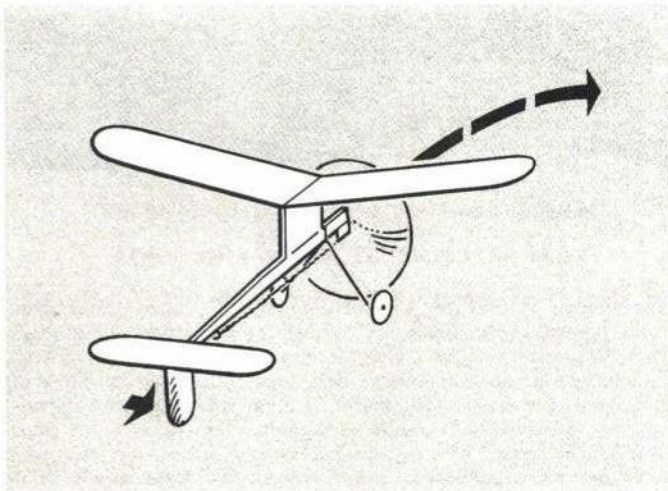
One plastic propeller  $5\frac{1}{2}''$  diameter. 5" may be substituted or a 6" propeller may be cut to  $5\frac{1}{2}''$ .  
 One 2 or 3 washers — piece of  $\frac{1}{8}''$  flat rubber 36" long for 4-strand rubber motor.  
 One piece of  $\frac{1}{2}''$  long metal tubing big enough for the .030 or .045 wire to fit through — can be cut from inside a ballpoint pen.

#### MISCELLANEOUS

Small amount of liquid hair shampoo for lubricating rubber motor if model-type rubber lubricant isn't available.  
 A winder for the motor. Use a small hand drill with a hook in the chuck, or use an R/C escapement winder.  
 Bottle of white glue.  
 Spool of thread.  
 Some help in bending the small wire parts if you aren't strong enough.  
 Drop of oil for the 2 or 3 thrust washers.  
 Small piece of wax paper.



5. Stretch four-strand motor three times its length to wind maximum of 250 turns with winder. "Walk" it in as you wind.



6. Bend trailing edge of fin in direction you desire model to turn. Breath on wood, and bend gently while doing so.





# model world

...on the international scene



## Radio-control planes superior to real aircraft in industrial tests

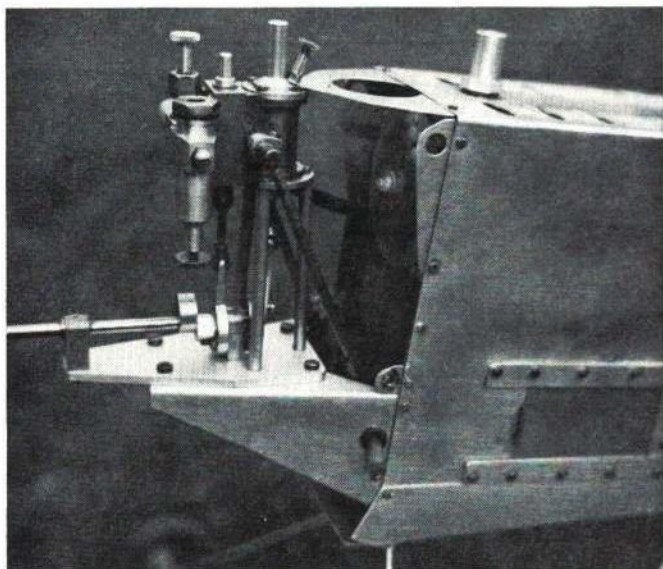
Top: Salvo of four 14" various colored test shapes drops from radio-control model flown by Ted White at Sandia Laboratories, East Mesa facility. By photographing drops through a tracking telescope, four colors of the "bombs" are caught on one piece of film under identical conditions of lighting and background. Project involves systematic study of resolution of all types of color film and black and white. Above: Checking release mechanism — tracking scope, background — are, L to R, Dan Parsons who conceived idea, Ted White, Clarence Robinson who handles photography. R/C planes also used to carry blast pressure gauges in explosive tests, and for tracking practice at Tonopah Test Range. Real aircraft are far less useful.



## Girl beats all but one man in the Free-Flight event at British Nats

Perfectly timed action photograph by Martin Dilly was taken during last summer's British Nationals. Picture is doubly interesting because of the fact that modeler is Sue Miller who embarrassed the experts — men, of course — by flying to second place in Open Power Free-Flight Event. She beat 112 other contestants to capture the honor. Model, which appears to blend best of simple, functional features, and quite basic construction, is powered by Japanese-made O. S. Max-15, of .15 cu. in. displacement. We suggest that FAI-type competitors keep a wary eye on Sue! And, if you are thinking that she got lucky, forget it! Girls have won first places at our Nats in, of all things, stunt and combat.





### **Steam-powered radio-control plane flies successfully on rudder-only**

Above: Unique steam-engine, designed and built by D. E. Parker of England, powers model shown in flight at right. The boiler is made of stainless steel sheet and tubing; engine operates at 60 lbs. per sq. in. pressure. It turns a 12" plastic prop with a pitch reduced to 6". Static thrust, one pound. Span is 7', weight 38 oz. Rudder-only, single-channel radio control handles things in winds up to 6 mph. Duration on power is 3 min. on 1½ oz. meths. and 2 oz. water; more fuel could be carried by adding another tank. Pressure gauge and safety valve essential features. Parker, midway in series of projects, has perfected system for 100 lb. pressure, shorter, timed run. Pictures and information from the English magazine, the Aeromodeller.



### **Air Force Major took ten years in assembling a 250-plane Luftwaffe**

Putting the finishing touches on a Messerschmitt 109 is Major Donald E. Evett, of Scott Air Force Base, Ill. Evett, a recognized authority on German Luftwaffe aircraft, assembled a 250-plane armada. He estimates that about ten years time were spent on this unique project. Some idea of the amount of work involved may be gleaned from the fact that he has so far spent \$200 on the air brushes used to paint them. Markings are superior to trade decals. He has been building models since he was a young boy in the Pacific Northwest, when he dreamed of being an aeronautical engineer or a test pilot.



### **Royal Air Force 50th Anniversary celebrated by novel model exhibit**

Helping celebrate the 50th Anniversary of Great Britain's Royal Air Force were 12 display scenes, like this one, part of model display at Science Museum Garden. The history of the R.A.F. was depicted by the progressive scenes. The model aircraft all were in 1/48th scale. Adding considerably to the realism of the exhibition were three-dimensional hangars against an appropriately painted backdrop. This particular scene recalled the Central Flying School at Upavon, during WW I.



# R/C at the Nats

HOWARD MC ENTEE

FOR a few of us, another Nats at Olathe was sort of like a homecoming, since the big meet had been held there in 1948 and 1949. There were R/C events at those two meets, of course, but the differences between R/C then and now are almost beyond imagination. In those years there was only one event, most planes carried only the simplest rudder apparatus, the "stunt pattern" consisted of a few extremely simple maneuvers, and the R/C turnout was small. Today — well, most of you know what our planes and equipment are, and what they can do. An entry of some 190 in the three main events, as we had this year, (many modelers entered more than one event, of course) would absolutely have swamped the facilities back in the late forties.

Kansas treated us to quite nice flying weather — at least it was clear, though hot and humid! Gusty winds early in the meet bothered early morning flyers, both Pylon and Pattern.

The local R/Cers had located a huge motel as R/C headquarters — the Glenwood Manor in Overland Park. This was about 21 miles from the R/C flying areas, and 20-25 minutes road time, depending how close one wished to adhere to the 75 mph speed limit on the Interstate to Olathe.

First procedure for the R/Cers arriving at the Base was transmitter and license checking. We found an old friend, Jim Fronkier, an active Kansas R/Cer and ham radio operator, presiding at the monitor receivers. Jim had flown in both the earlier Olathe R/C contests. These checking facilities

were open on Friday so the Pylon flyers could get checked in for an early Saturday morning start. Most transmitters went through with no problems, but a few required attention. One, for example, showed a very broad and rather weird pattern on the Spectrum Analyzer (these Hewlett-Packard instruments were used for the first time this year at Nats R/C, and proved most helpful in spotting such cases as this) which turned out to be caused by a nearly dead battery! Far as we know, there were no transmitters other than multi-propo put through the tests this year. Generally a Collins receiver was used for 27 MHz spots, the Spectrum Analyzer for 50 and 72, both at the transmitter check and in the field. Interference this year was almost nonexistent, due partly, no doubt, to the isolated location of the Base. The only interference spotted by the monitors was from a few transmitters inadvertently left on as the pilot walked from the flight line.

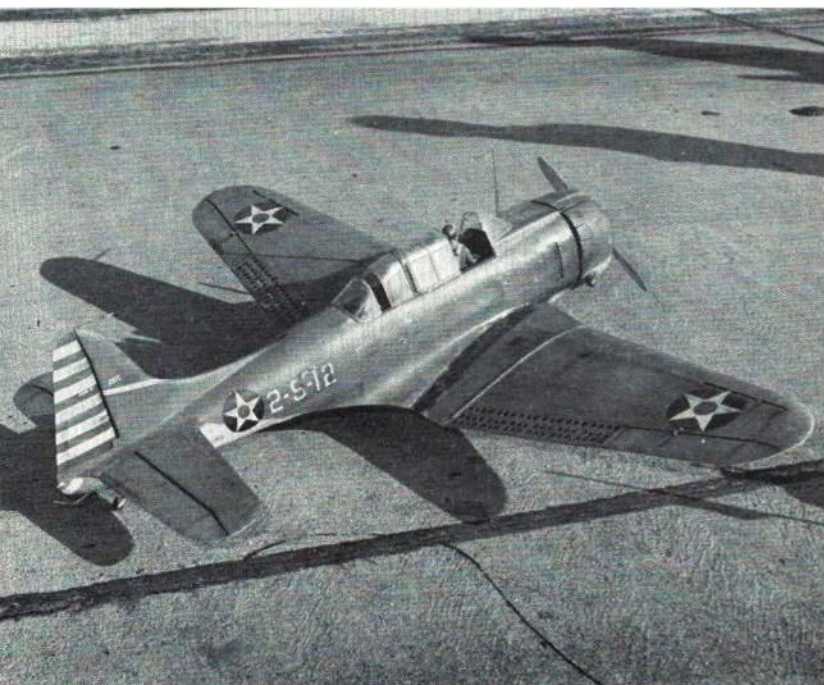
R/C flying started Saturday morning, August 3, at 7 a.m. with Pylon. We'll cover this event later in a separate section. The usual Navy Air show ran from 1-3 p.m., both Saturday and Sunday and all model flying was then suspended. However, a few R/C flyers were drafted to send their planes aloft both days during lulls in the program. They included both Stunt and Pylon flyers. One of the latter suffered an unfortunate case of interference when his plane passed near a Crash Truck which just at that moment called the Tower. This was Ed Izzo who had been flying a short mock race with Don Lowe. Ed's plane was totaled which put him out of Pylon, since his other plane for this event had been wrecked during

Qualifications. Other than this mishap, the R/Cers put on a good — and much applauded — show.

In wandering through the display hangar Saturday we came upon an area swarming with youngsters, all anxious to "sign up" for something. Turned out to be the Delta Dart (or AMA Cub, if you prefer the name of the latest model) competition being conducted at the Nats as part of AMA's program to get more youth into model aviation. This has little to do with R/C and we mention it here only because practically all members of the nearby Shawnee Mission R/C Club had given up their chance to fly at the Nats in order to run the Dart competition. This event was most successful, deeply impressed two admirals who viewed the competition in a cleared hangar, and resulted in some Dart winners going on the Navy trip to Pensacola. Furthermore, *every* entry (and there were hundreds!) received free Cub kits, and dozens of daily winners substantial gifts of modeling equipment, winner or not. We trust this effort gains the attention it deserves in the model press. We should note that several members of the Pittsburgh (Pa.) ARCS radio group joined the SMRCC in this endeavor.

A meeting was held on the Base Sunday night to give Pattern flyers information on flight lines and other pertinent instructions, but much needless time was wasted on countless questions from flyers concerning how to perform certain maneuvers. It seems to us the answers should have been self-evident to pilots of a caliber good enough to fly in a Nationals!

Since the Navy could offer only a limited number of personnel to help run R/C (and



For the first time, maximum scale points were awarded. To Dave Platt's one-eighth full-size, SBD-3 Dauntless went the honor.

This SBD-3 was not fresh off the assembly line but a facsimile of a well-campaigned aircraft — chipped paint, rivets and all.

With just a touch of down elevator, Bertrand's Fokker D-VII lifts its tail on the takeoff run, right. One-fourth full size.



## The Kansas Monsoon likes modelers. It paused, let the sun shine on Olathe's occupation by the Nats—then started again. In between things kept popping.

all other Nats events), civilian help was recruited literally from all over the country. We found several B.I.R.D.S. helping on the flight line and in tabulation—took us back to Los Al in '67! The first rate job done by the few Navy boys, however, was emphasized to us by John Patton, Pattern Event CD. Some Boy Scouts from local Olathe troops also gave valuable assistance during the four days of Pattern flying.

The Navy top brass did everything they could to provide needed equipment for the meet. We had heard early rumors that no shelter tents could be provided for the R/C sites, but when Pattern flying started, there they were—most welcome hiding spots from the scorching sun.

**Pylon:** Qualifying for Pylon Finals ran for five hours on Saturday and Sunday. At the same time a "decentralized" Pylon Qualification meet was being run at Tahlequah, Okla., some five hours by road from Olathe. We don't know the exact split of entrants between the two sites, but a total of 37 flyers actually completed the Goodyear course; it is believed that about 15 flew in Oklahoma. The actual entry in Goodyear was 58, and 44 made flight attempts. The Oklahoma meet was run by the TORKS, with Curtis Brownlee as CD, and sponsored by the Tahlequah Chamber of Commerce.

The mornings were quite gusty at Olathe, giving the pilots some anxious moments and causing a few crashes. Most survived, however, and from the qualifiers at both sites, 20 finalists were selected. This group was named after handicap judging, of course, and during this judging several planes were disqualified for insufficient

wing area and for not meeting fuselage specs.

We were a bit surprised to see that Ed Shipe was not running Goodyear, but it turns out that he had been asked to handle all R/C events somewhat earlier in the year when no local R/Cer could be found to tackle this job. Besides much experience in Pylon and R/C generally, Ed is a member of the Nats Executive Council. He had appointed Lou DeLaTeur as CD of the Pylon events.

Joe Foster had the best qualifying time, with 1:53.9 and a handicap of only 1.2 sec., while Granger Williams was next highest with 1:56.0 but with a 4.6 sec. handicap. Despite this relatively large handicap (highest of any of the qualifiers, while Foster's was the lowest), Williams was able to win the Finals, flying his own design, La Jollita. (Other winners will be found in the AMA listings, this issue.) The top 20 qualifiers all received plaques, while the ten top winners won trophies.

As to the planes in this event, they seemed to be better finished than ever, if that's possible. Incidentally, those planes in the 450 sq. in. category will henceforth be known as "Formula I" Pylon racers; the 600 sq. in. wing group will be known as "Formula II." Unfortunately it was impossible to run a Formula II exhibition race at the Nats, as had been hoped. There just wasn't enough time to fit it in.

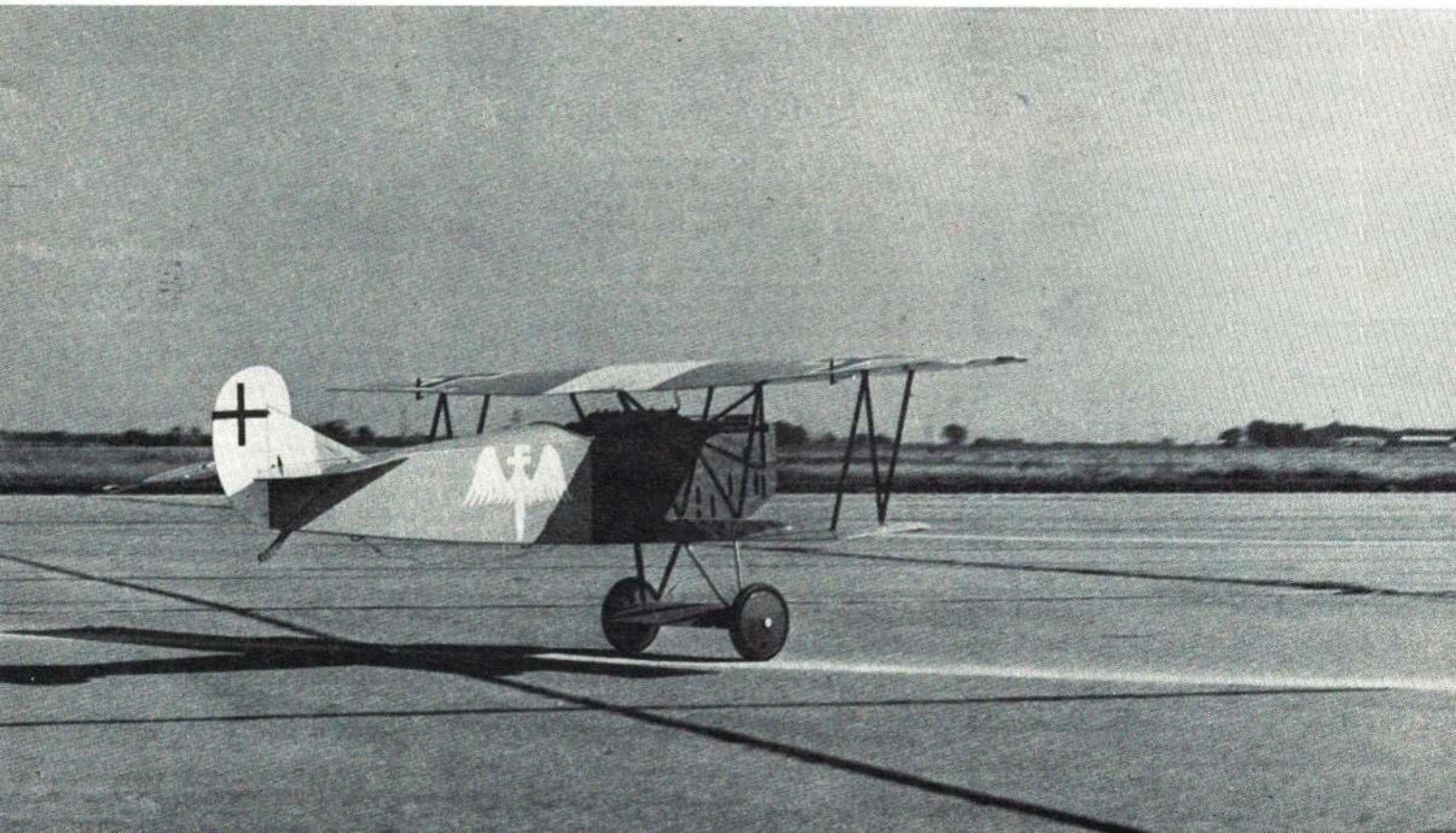
Pylon Finals were run on Wednesday and Thursday, August 7 and 8, from 4-7 p.m. both days, or at least that was the schedule. A good group of heats was run off Wednesday, but Thursday only five races had been held when a storm that had been building

up all day hit the area. This brought a sudden end to Pylon—and the entire Nationals!

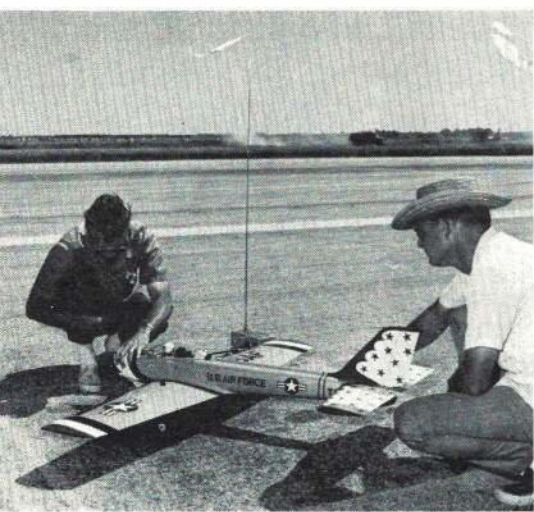
**Pattern:** This event had a field setup which has been rather standard for some years at Nats—two widely separated complexes on the same runway (about 2500' apart this year) with one circle at each, and two flight lines running from each circle. Due to the wide separation between circles there was little interference between planes flying from each simultaneously. The entrants had been split fairly evenly on the four lines by frequency, based upon the pre-Nats entry of 79 and an expected late entry of perhaps 20 more (based upon past experience). All this planning went adrift, however, when there were almost 50 late entries, for a total of 125. This meant some flight lines were considerably longer than the others, but it was decided to stick with the scheduled frequency split, and as it turned out there were five complete rounds of qualifying. Site A had 28 on line one (all 50 MHz) and 21 on line two (26.995, 27.045, and 27.145). Site B had 23 on line one (27.095, 27.195, and 72.24), and 21 on line two (all the other 72 MHz band spots).

We were somewhat surprised to see that the frequencies which AMA strongly recommends were not strictly adhered to on the 50 MHz band. Actually, this might not seem too important at the Nats where only one 50 MHz plane will be in the air at any one time, but it has been proven that splatter, harmonics, images and other difficulties can occur between equipment on different R/C bands; it was partly to eliminate problems from this that the carefully selected 50 MHz R/C spots were set up, but all sorts of oddball 50 MHz band frequencies were approved for Nats flying.

The 21 civilian judges came from all over the States, and two were from Canada. As Head Judge, Bill Northrop had the task of keeping this group moderately content, and from the few complaints we heard on judging his gang must have done a top grade job. For the two qualifying days the judges worked for 2½ hours, were off the next 2½. Under these circumstances it was possible for any given flyer to have the



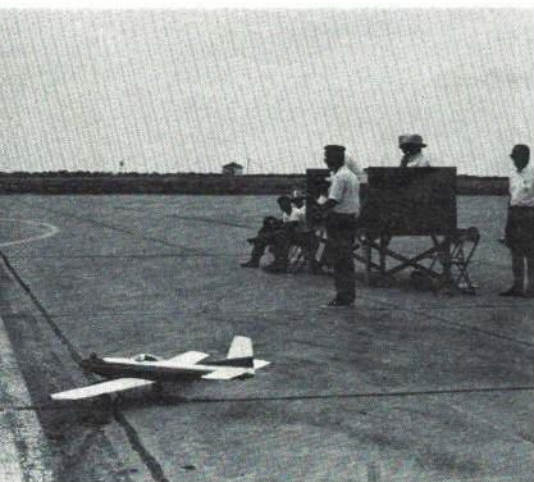




Jim Kirkland, Ron Chidgey at right, used his new Triton design to gain a second in Pattern and a berth on the 1969 FAI team. This design will appear in a future A.A.M.



Pierre Marrot (at right), France's radio-control champion, finished ninth in Pattern. His shoulder-wing design, Styx I, was Rossi 60 powered. "Radio Pilote" gear.



Quality of R/C judging was highly praised. Twenty-one judges "did time" in these elevated box seats. Ron Chidgey begins the proto taxi maneuver during Pattern Finals.

same set of judges more than once, but for the Finals the FAI system of judge rotation was employed, whereby each judge handles a specified number of flights before relief. This way no flyer can ever get the same set of judges twice.

As we said before, the Navy boys had a hard time getting shelter tents up, but when the job was completed, one large one at Site A sheltered the "office" of Pattern CD John Patton, the monitoring equipment, tabulation section, and transmitter impound. A smaller tent for officials and impound was at Site B, and at both locations there was a tent to shelter both flyers and planes from the hot sun.

A Hewlett-Packard Spectrum Analyzer was at each flying site, plus a Collins receiver for the 27 mc spots. This equipment, plus the P.A. amplifier at Site B "blew up" on Thursday morning due to a defect in the power supply generator which resulted in the use of much lung power until replacement parts could be secured. Fortunately, as we've noted, real interference was almost non-existent. Few cries of interference were heard from the flyers when in trouble. Someone opined that most pilots are now expert enough not to make this cry when they have goofed!

Site B was presided over by Assistant Pattern CD Maynard Hill, and since it was the farthest area from the hangars and other buildings on the field—sort of out in the styx—became known as Lower Slobovia (no offence, M.H.). During both Qualifying and Final flying, the group of modelers who had been at Site A the first day were shifted to Site B on the second, and vice versa. Since it was more open, Site B was also used for Pylon and Scale flying as well as Pattern.

We were honored to have the R/C Champ of France, Pierre Marrot, flying at the meet, and also the recently crowned Champ of Japan, Isao Matsui. Marrot, who placed second to Kraft at the R/C World Championships last year in Corsica, manufactures "Radio Pilote" multi propo R/C equipment, while Matsui produces R/C accessories, landing gears, hinges and many small parts.

As Qualification flying advanced, it became evident that both these flyers would probably get into the Finals, which they did. Since Marrot ended up with the top qualifying score (1801 pts. out of a possible 2280 for the sum of his best two flights), the possibility of an "international incident" arose. Should he win, could he be the U.S. National Champion, since he is not a U.S. citizen? In any case he would not be eligible for the U.S. FAI Team, due to FAI rules. As it turned out, these sticky problems did not materialize, as Marrot ended up at 9th place. Another "foreign" hotshot present was ex-patriot Doug Spreng who has been manufacturing R/C multi gear in England for a year, and who has been cutting a heavy swath through English and European R/C contests.

Doug is still a U.S. citizen, but the presence of two foreign flyers on the qualifying list raised another problem and resulted in an informal petition to the CD before the Finals started. The other flyers felt that these two had displaced two U.S. modelers, who might possibly be able to qualify for the FAI Team. As a result, two more U.S. pilots were added to the Finals. The list thus included the three 1967 FAI Team members, those who qualified prior to the Nats, and the group which qualified Monday and Tuesday at Olathe. Our unofficial list shows that 34 flew in the Finals. The pre-qualifiers did not have to fly in the Qualifying rounds at Olathe, but as far as we could check, all did except Phil Kraft, feeling they could use the practice. Judging

from results, apparently Phil didn't need this extra practice!

The Qualifying flights were to a shortened list of FAI maneuvers, with eight minutes allowed for the flight and two minutes to get airborne. Maneuvers were Take-off, Double Stall Turn, Slow Roll, Rolling Circle, Tail Slide, Horizontal 8, Cuban 8, Top Hat, Landing Pattern, Spot Landing. Maximum possible score was 1140 and the top Qualifying score we found was 953% by Marrot, with Don Ballreich topping the U.S. flyers with 938%. The judges must have been really tough because there were very few scores over 900.

We'd like to say that everything went smoothly in Qualifying from the very start, but it didn't. Monday morning showed a shortage of various equipment including adding machines. Most vital of all, there was no drinking water for the judges; this almost caused a judges revolt! The Navy boys working on R/C promised to bring plenty of iced drinks to the area for judges and other officials on Tuesday—and did just that. Adding machines came along later on Monday, and a talented adding machine operator from New Orleans (a modeler's wife) arrived soon after, which helped greatly in speeding tabulation.

All in all, Qualification flights ran off with machinelike regularity, and it was found possible to get in five full rounds, though only four rounds had been expected. Credit here must go to the flight line coordinators who kept things really rolling.

We were happy to see quite a few Junior and Senior flyers in Qualifying, and a few made it to the Finals. Many in this group, as well as those entered as Open Novice pilots, received awards regardless of whether they made the Finals. There were 13 entrants in the Jr.-Sr. group, eight of them Juniors; 12 flyers comprised the Novice contingent.

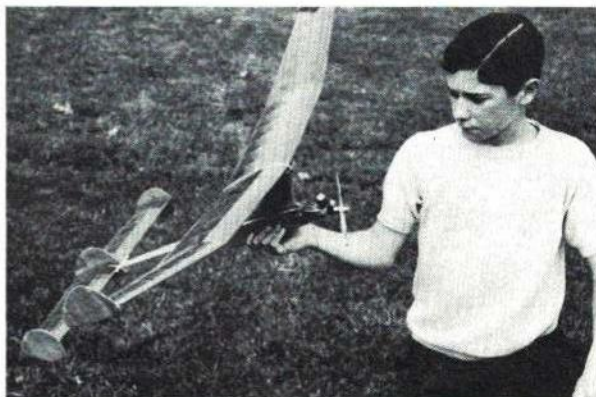
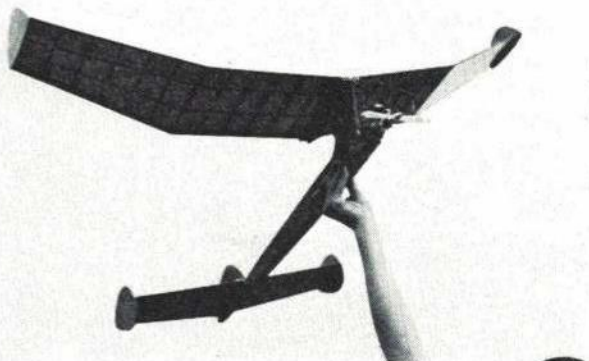
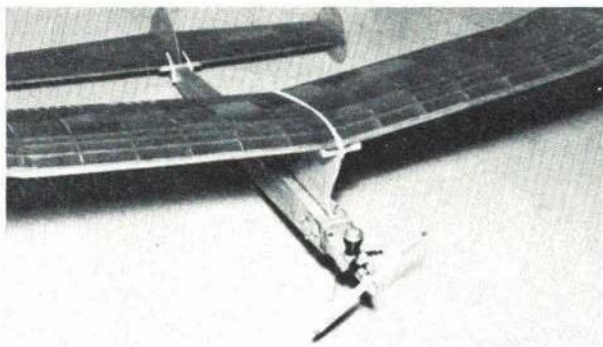
When the Finals started Wednesday morning, most 27 MHz flyers and all those on 50 were in one group, the remaining 27's and all those on 72 in the other. Only a single flight line was run at each circle, and, of course, the full FAI pattern was flown. Frequencies were picked for each line so that the flyer in the ready box could safely turn on his transmitter to set throttle or check equipment with no possibility of interference to the plane in the air. The two lines were fairly well balanced, with 17 on one and 16 on the other.

Again things went smoothly and fast, and it turned out that six rounds could be completed (with a few minutes to spare!) before Pattern had to be shut down Thursday afternoon so Pylon Finals could commence. Many pilots had shaky starts in the Finals, but picked up steam later. Those who ended up as the FAI Team—Kraft, Kirkland, and Whitley—all had virtually their lowest scores in Round 1. Perhaps the judges were starting off tougher here, too? It was interesting to watch the various judges score such maneuvers as loops; some held up a finger or pencil to indicate where the loop centers should be, most just used eyeball measure, but one judge had a cross of small wood sticks about 12" long that not only indicated loop centers, but roundness. This particular judge (Bob Talley) was the "troubadour" of the judging contingent, since he carried a banjo with him constantly; some flyers complained Bob held his banjo up in the air to check loops, and downgraded them severely if their planes didn't follow the outer edge of the banjo exactly!

Unaccountably, some experienced flyers ran out of time at Site A on Wednesday, thus losing scores for a maneuver or two

*Continued on page 68*





Top, left: Hot TD049 is standard in 1/2A free-flight competition. Tank mount allows simple fuel line set-up.

Top, right: Tip-plates galore! Add adhesive-backed foil to them. It helps the timer to keep your model in sight.

Lower, left: Author displays old (at right) and the new Strato-Streaks. Increase from 220 to 275 squares evident.

Lower, right: Son Gary shows off down-thrust. It is effective! A wire skid keeps the engine out of the dirt.

# STRATO-STREAK '68

Updating a 1941 design, results in a Half-A free-flight model with a hunger for altitude.

## FRANK HEEB

WHAT was the hottest climbing gas model in the wild competition of the early 1940's? And what is the best performing, most winning "Old-Time gas model" in this popular modern event—a model so hot that some factions of the Old-Time movement want to have it outlawed from their contests? The answer to both is Louis Garami's Strato-Streak, an Atom-powered bomb that was published in the December, 1941 Air Trails (the forerunner of this magazine).

I got involved in the Old-Time competition about two years ago, and it didn't take much magazine research before I came across the Strato-Streak. There are few pre-1942 gas model designs that can be flown successfully with modern glow-plug engines, but the S-S has the following favorable design features: Large stab—40% of the wing area; polyhedral wing; fairly thin, flat-bottom, wing section; wing pylon; generous fin area; clean fuselage,

minimum cross section; short nose; sensible structure, easy to build and repair.

I built the 1941 S-S, modified for a TD 049; this was the first S-S I had ever seen. In the beginning, I had trouble adjusting the model because I thought I was smarter than Mr. Garami and didn't start out with the right side-thrust he recommended. I wound up with 17 degrees down-thrust and 4 degrees right side-thrust, prop reversed, right stab-tilt, and slight right rudder tab. The model finally climbed and glided right! All of these adjustments force the model into the "grooviest" right spiral climb I have ever achieved with any gas job—this is with a wide right-glide circle. The altitude gained on a 20 sec ROG flight is simply ridiculous, for the model is almost out of sight straight up. I placed second at the 1966 Chicago Nationals Old-Time pylon event right between two other Strato-Streaks.

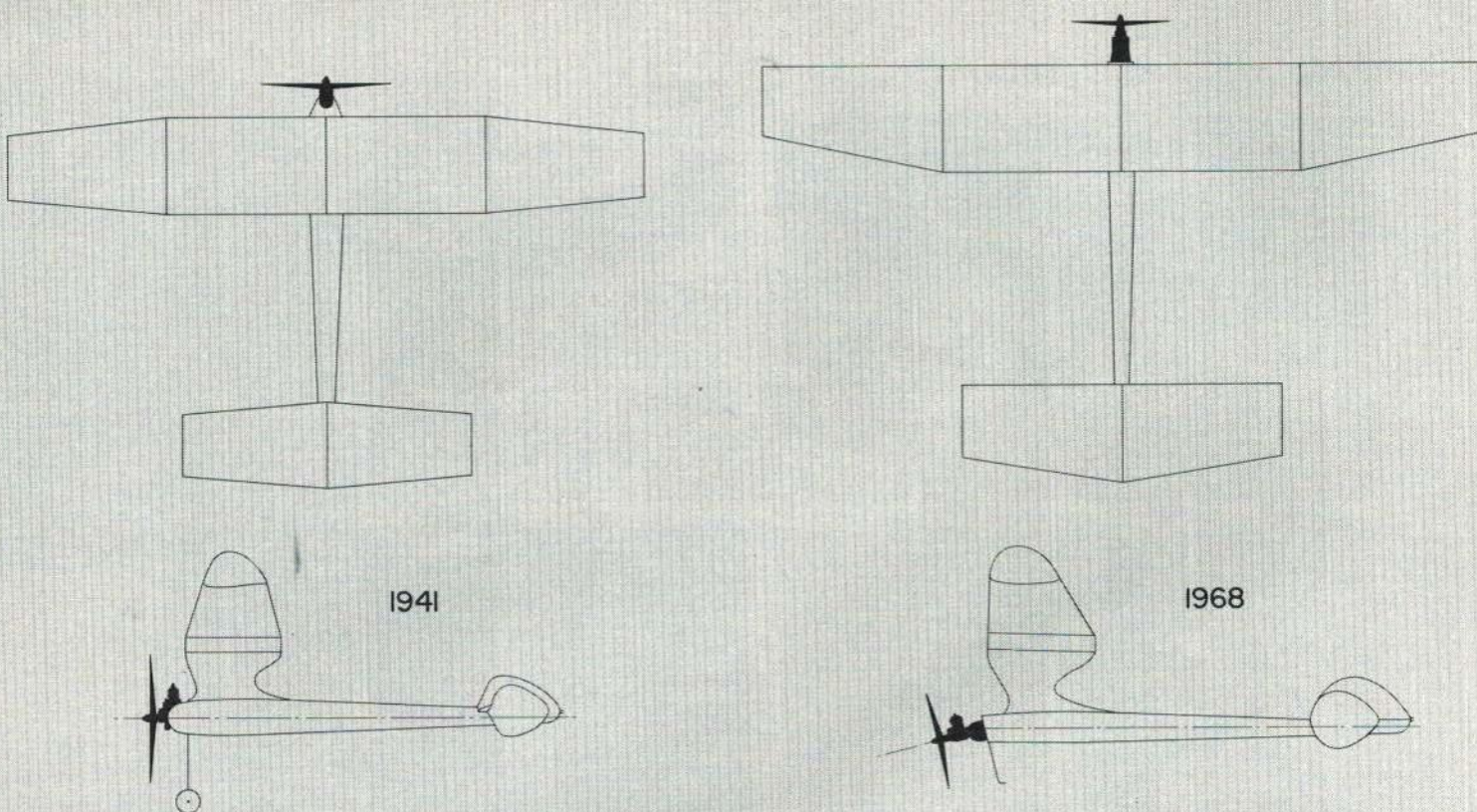
After some thought on the subject of why the 26-year-old S-S design is outstanding and still competitive (one almost won 1/2A at Chicago) in modern AMA events, I became convinced that an up-

dated, slightly enlarged S-S would be just the thing for the short engine run and lower max contests that are popular in the Midwest. S-S 68 is the result.

I wanted the model capable of utilizing full TD 049 thrust with hot fuel, so the wing area was increased from 220 to 275 sq. in. The fuselage was slimmed down, but the moments, pylon height, stab area, fin area, etc., are all proportional to the original. Multi-spar construction was used for a high strength-to-weight ratio and rigidity. The wing loading came out at 3 oz. per 100 sq. in. The 1941 original had 5.5 oz. per 100 sq. in. The new model gross weight is 6.5 oz.; the original heavyweight ignition job weighed 12-plus oz. So the decreased wing loading and increased power are the major contributors to increased performance.

It is not clear why Mr. Garami used five vertical fins in this design. All of this fin area, in conjunction with sufficient right-thrust to start the model out to the right, does seem to make the S-S "groove" in a very rigid right spiral climb pattern. The only drawback to this "maybe excessive"





Comparison between 1941 Strato-Streak and current version points up changes. Wing and stab leading edges are now straight; absence of an ignition system keeps fuselage slim.

fin area is that the S-S must be forced to turn in the glide. Apparently, the fins counteract the right power turn that is generated by the reaction of the prop-wash on the pylon; this right turn tendency is usually quite strong on this type high pylon design. The wing tip and stab tip fins are all out of the prop-wash and probably have a stabilizing effect. Right-rudder and right-thrust would be sudden death on most other pylon designs, unless a lot of wash-in is warped into the right wing. No wing wash-in is required on the S-S.

Construction is straightforward and no unique or original features are used. Good contest-balsa should be used on all sheet surfaces, but medium-hard balsa is used on the spars, leading edges, and trailing edges. A very rigid structure is mandatory for this small, high-speed model. All joints should be double glued. Don't omit the trailing edge gussets or the spar webs; they add considerable strength with very little weight increase and time spent. Exact alignment of all five fins is most important, so make sure the ribs which locate the fins are in true position.

**Model rigging:** The wing and tail must be keyed to retain exact alignment of the surfaces to the fuselage. I establish a fuselage reference line on the fuselage topside by stretching a thread between two pins on the fuselage centerline. The pylon is located on this line, and the wing and stab must be located exactly perpendicular to this line.

I used tissue on all surfaces (except for the fins), the fuselage, and the pylon. Two coats of dope and at least one coat of epoxy all over and a second coat over fuel and engine exhaust spray areas will result in a lasting finish.

The finishing touch is fiberglass cloth and resin coated around the firewall. This wonderful material, although somewhat heavy, is absolutely fuel-proof and has amazing strength. The cloth is wrapped around the firewall to the fuselage, and two coats of resin over the entire front end about 3" back will hold the firewall on permanently.

**Flight test:** Now the most important, and critical phase for a contest model. With the CG located as shown and the 2 degrees wing/stab angular difference built in, the

model should hand-glide satisfactorily. Correct any diving or stalling tendencies by changing the stabilizer angle with thin hard balsa shims. If the CG is off very much, correct with trimming ballast. If much angular difference is removed (stab angle increased), hand-glide at high speed several times and make sure the model zooms and doesn't tuck in. Don't expect much of a glide circle. Now add some stab tilt (if none was built in) to start a glide turn. I usually glide power models to the right for an easy transition from a right climb, but the S-S can glide either direction without transition problems.

After sufficient hand-glides to build up some degree of confidence in the model's stability and trim, you are now ready for power flights. Perform a ground engine run test with the prop reversed and the engine running fairly rich but smoothly. Set the needle valve correctly and let the timer function—make sure the timer and shut-off work under engine vibration.

Now set the timer for 4 seconds, restart and launch at about 45 degrees. The down-thrust will prevent any tendency to loop. The S-S should hold the launch angle in climbout, build up speed and then increase climb angle. Force the model to climb right with right-thrust and slight right-rudder tab if necessary. Take it easy and think out each adjustment before its application. Gradually increase power and engine run on each flight until max power on a 10-second run is attained. Then put the prop on correctly and repeat the tests. Of course the dethermalizer must be used on all flights.

The S-S 68 will prove to be a reliable and rewarding model for any serious contest flyer. It is especially suitable for the 10-second hand-launch rules which, at the time of this writing, are under consideration as an AMA rules change proposal. So, thanks to Mr. Garami for his 1941 design, which I used as the basis for a different 1/2A configuration that can take high power. Who was that guy who said "there's nothing new under the sun"?

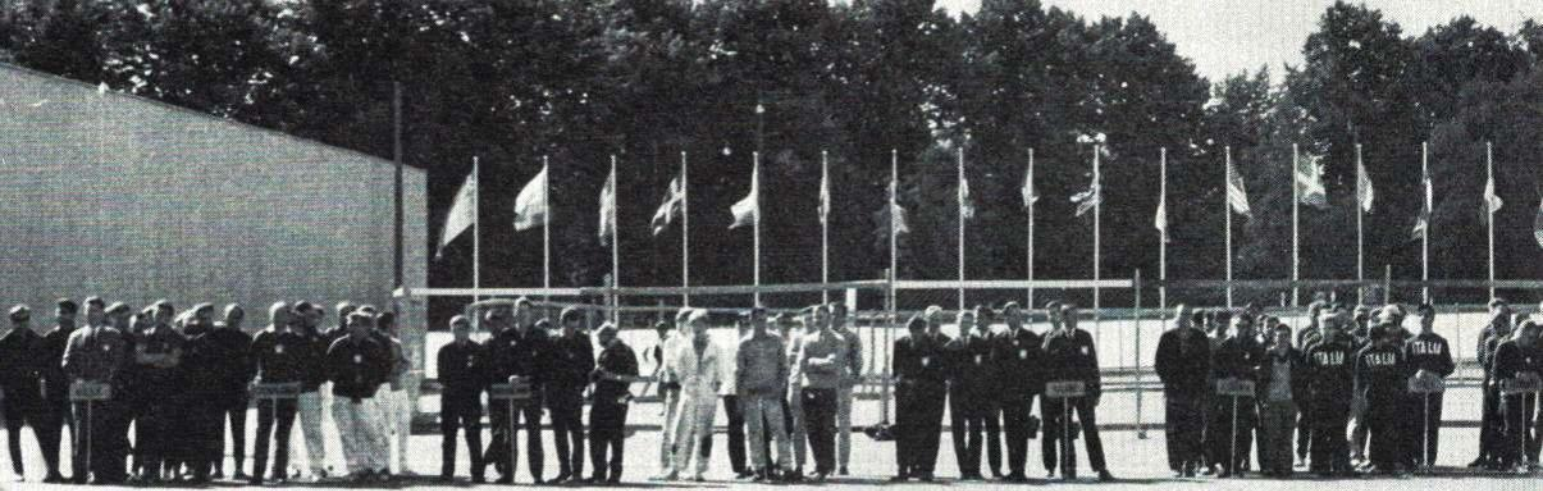
#### STRATO-STREAK COMPARISON CHART

Specifications	Original, 1941 Design	Old-Timer, 1967 Version	Latest, 1968 Version
Engine used	Atom .09	Cox TD .049	Cox TD .049
Prop used	8-?	5 1/2-4 (reversed)	6-3
Thrust (units)	1.0	2.0	2.5
Fuel used	3:1 gas/oil	TD Blue can	TD Red can
Down-thrust	0 degrees	14 degrees	14 degrees
Wing area	220 sq. in.	220 sq. in.	275 sq. in.
Gross weight	12.0 oz.	7.2 oz.	6.5 oz.
Wing loading (100 sq. in.)	5.5 oz.	3.6 oz.	3.0 oz.
Power loading	.083	.28	.37
Relative performance	1.00	1.75	2.00









## World Wide Competition

# 1968 Control-line

JOHN D. FRANKLIN

THE U.S.A. almost cleaned up all three events. One, 2, 3 in Speed, 1st in Team Race and 3rd, 4th in Aerobatics, all these places as well as the team prizes in Speed and Aerobatics, plus a 2nd team position in Team Racing. Josef Gabris of Czechoslovakia, the World Champion in Aerobatics for the second time running, was the only non-American to get an outright win!

The event was held at a fairground site, just minutes from the center of Helsinki, Finland. Organized by the Suomen Ilmailuliitto — Finland's Flyforbund r.y. (Finnish Aeronautical Assoc.), their President, Edward Wegelius, together with Finland's Minister of Education, Johannes Virolainen, opened the meeting. The line-up of 21 National teams (172 contestants) with all the Nations' flags fluttering in the background was very impressive and as Johannes Virolainen said in his speech: "If only the nations represented here today, could be as well related in worldly affairs as they are here in model flying, the world would be a much better place for all of us."

The flying site had the 1952 Olympic Stadium at one end, tall buildings on one side, opposed by low buildings on the other. The flanking buildings formed a "V" shape in plan view and the turbulent air conditions played havoc with Aerobatic maneuvers. The various flags and wind markers were constantly flying in opposing directions around the Aerobatic's areas and those with early flights had a distinct advantage, by flying before the air became disturbed.

Contest Director Sandy Pimenoff, and the various event organizers, really made things swing. There were no delays between flights and events were started later than advertised in the program for this reason, on the last two days. The U.S. teams, under Team Manager Peter Brandt, had their own transport and were able to practice at Malmi Airport. This proved valuable for acclimatization, but careful advance preparation by all team members before leaving the States had left little to chance and no one had any real problems. Malmi even boasted a model shop and clubhouse, open to contestants.

The fact that the weather was perfect for

all four flying days, and the accommodation the best ever, made up for the flying site's disadvantages. Unfortunately, space does not allow a complete run-down on each flight or racing heat.

**Speed:** Things did not seem to be going too well for the U.S. speed trio in practice. Bill Wisniewski was in the low 150 mph bracket and Roger Theobald's model was only going fast on occasions, though he did record one run of 164 mph. Both were flying Pink Lady designs. They were using the latest version of the T.W.A. 15 engine made by themselves with the new die-cast crankcase, slightly different porting and no insulation between the engine and the tuned length exhaust pipe. Roger Theobald was also using one of the old 0.008 thick element Cox T-D 15 "trumpet" cylinder heads in his T.W.A., secured with a clamp ring. This eliminates the end of a glow plug disturbing the head's internal contours and, as the head is made entirely from alloy — not alloy and steel as would be the case with a glow plug in it, both having different rates of expansion and heat transmission — it gives off heat uniformly.

Because of the drawn order of flying,



America's winning speed team used Pink Lady's and T.W.A. hand-made 15's with tuned pipes. Nelson, center, made 159.1 mph.

Team Race was a real challenge to the finish. Stockton/Jehlik won on last flight by only four seconds. A very rough race!





# Championships

Last August, teams from 21 nations entered the ring to decide the World's best in Speed, Stunt and Team Race.

things were pretty quiet until the end of each round. Round 1 saw no one surprised by Californian Arnie Nelson's 154.1 mph flight from his Pink Lady and T.W.A. set up. Completely relaxed, he just trotted round the pylon after a quick come-in of the pipe. Bill Wisniewski flew his Pink Lady T.W.A. set up, but with a conventional glow plug to make 152.9 mph and Miklos Sebestyen, using a Moki S-6T, was the only one to get near the two leaders at 146.6 mph. This left it to the Russians to try and break the U.S. lead.

A. Lapinin had the best Russian engine

in a very nice model. The wings were titanium sheet, welded all down the trailing edge and filled with polystyrene foam. His flying style was completely relaxed, using a pump action handle and 149.8 mph was recorded to tie for third place in Round 1 with M. Sebestyen. V. Malanchuk (U.S.S.R.) followed up team mate A. Lapinin with 149.1 mph while Roger Theobald was almost 3 mph slower at 146.6 mph. Roger's swing-over-the-head, whip flying style had to be seen to be appreciated. This is very important, because if the engine is off tune, whipping can help to cut the motor, and it

is possible to get another flight in during the remainder of the three minutes allocated time. All of the Italians were trying to sort out their new G.15 RV's with side-exhaust adapters and the new Super Tigre tuned-length pipe. They were really screaming in the air, but the fastest time was 132.9 mph sounded well underpitched to most of us.

Some 40% of the contestants did not record a time in this round. Round 2 saw Arnie Nelson really go with 159.1 mph from his conventional "Pink Lady." The other team members could not manage such a

## CONTROL-LINE WORLD CHAMPIONSHIPS

FAI Speed (listed as miles per hour) \* indicates best speed

Individual Placings	Country	Round 1	Round 2	Round 3	Engine used
1. A. Nelson	U.S.A.	154.1	159.1*	143.5	T.W.A. 15 & Supertigre G15
2. W. Wisniewski	U.S.A.	152.9	155.3*	154.7	T.W.A. 15
3. R. Theobald	U.S.A.	146.6	148.5	150.9*	T.W.A. 15
4. A. Lapinin	U.S.S.R.	149.8	150.4*	—	Own design
5. M. Sebestyen	Hungary	149.8*	149.1	144.8	Moki S-6T
6. V. Natalenko	U.S.S.R.	109.4	149.8*	146.6	Own design
7. V. Malanchuk	U.S.S.R.	149.1*	146.0	135.5	Own design
8. I. Toth	Hungary	—	—	145.4*	Moki S-6T
9. Z. Pech	Czechoslovakia	129.3	143.5	144.8*	M.V.V.S. 2.5 RL
10. J. Frolich	W. Germany	—	140.4	144.8*	Supertigre G15

### Team Placings

1. U.S.A. 2. U.S.S.R. 3. Hungary 4. West Germany 5. Italy

FAI Team Race (listed as time in minutes and seconds for 10 and 20 kilometers)

Individual Placings	Country	Round 1	Round 2	Final	Engine used
1. Stockton/Jehlik	U.S.A.	4:26	4:47	9:19	H.P. 15D
2. Plotsin/Timofeev	U.S.S.R.	4:49	4:35	9:23	Own design
3. Gurtler/Baumgartner	Austria	4:34	4:30	10:28	H.P. 15D
4. Kropf/Nitsche	Austria	4:50	4:37	—	H.P. 15D
5. Mohai/Markotai	Hungary	4:37	5:11	—	Moki TR-7A
6. P. & O. Hasling	Denmark	—	4:41	—	H.P. 15D
7. O. & G. Sundell	Finland	5:17	4:42	—	Oliver Tiger
8. Trnka/Drazek	Czechoslovakia	—	4:48	—	M.V.V.S. 2.5 T.R.S.
9. Hughes/Turner	Great Britain	4:49	5:01	—	Eta Elite II
10. Votypka/Komurka	Czechoslovakia	6:29	4:49	—	M.V.V.S. 2.5 T.R.S.
14. Dunking/Wright	U.S.A.	5:14	4:53	—	Supertigre G20D
20. Marvin/Albritton	U.S.A.	5:11	4:59	—	H.P. 15D

### Team Placings

1. Austria 2. U.S.A. 3. U.S.S.R. 4. Hungary 5. West Germany

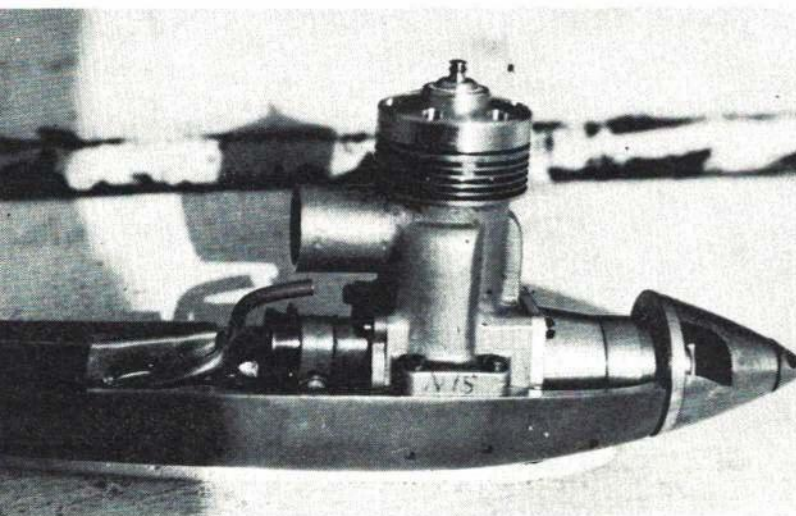
FAI Aerobatics (listed as flight points)

Individual Placings	Country	Round 1	Round 2	Round 3	Total	Engine used
1. J. Gabris	Czechoslovakia	2224	2622	2607	5229	M.V.V.S. 5.6
2. O. Anderson	Sweden	2289	2599	2611	5210	Fox 35
3. B. Gieske	U.S.A.	2553	2568	2471	5121	Fox 35
4. S. Wooley	U.S.A.	2421	2469	2593	5062	Fox 35
5. L. v. d. Hout	Netherlands	2413	2521	2529	5050	Veco 45
6. H. Twerda	Netherlands	2422	2556	2481	5037	Merco 49
7. W. Bagalini	Italy	2337	2433	2523	4956	Supertigre 35
8. L. Eskildsen	Denmark	2244	2421	2491	4912	OS Max-S 35
9. J. Silhavy	U.S.A.	2369	2528	1339	4897	Fox 35
10. L. Compustella	Italy	2393	2373	2405	4798	Fox 35

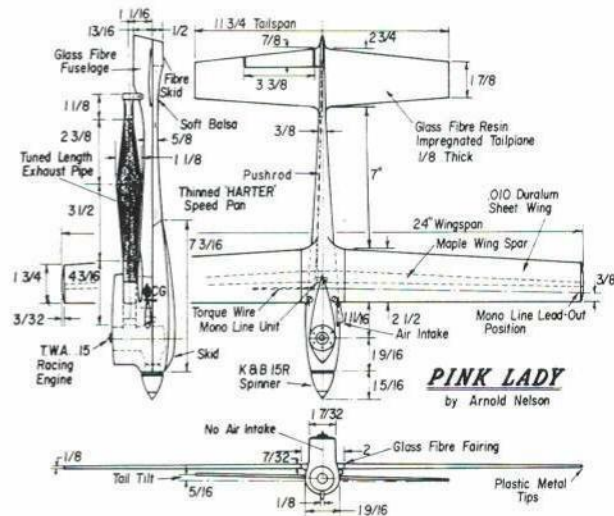
### Team Placings

1. U.S.A. 2. Czechoslovakia 3. Netherlands 4. Sweden 5. Italy





T.W.A. engine, designed by Roger Theobald and Bill Wisniewski, features cast crankcase, Cox TD 15 Trumpet-type glow head clamped in place, and rear-facing exhaust for tuned-pipe operation.



Pink Lady is a several times winner at the World Championships. Design seems equally to emphasize minimum wetted areas and streamlining. Pipe gives more thrust than drag.

big increase in performance. Wisniewski increased 2.4 mph for 155.3 and Theobald went up to 148.5 mph. The Hungarians had been busy sorting things out, but neither I. Toth nor K. Bathge recorded a time and M. Sebestyen slowed up slightly to 149.1 mph, which meant he went down to 4th place from 3rd, as A. Lapinin recorded an identical speed to his own and M. Sebestyen's 1st round time. The other two Russians, V. Natalenko with his piped "Start" engine, and V. Malanchuk, then recorded 149.8 mph and 146 mph respectively to give them 5th and 6th positions, just above Roger Theobald who put in 148.5 mph. Eighth place surprise in this round was Pagani of Switzerland with 144.2 mph from his Super Tigre G.15 RV. A Swiss flyer doing this must have really annoyed the Italians who were by now doing everything possible to get in timed runs. Z. Pech (Czechoslovakia) with the Sladkey designed M.V.V.S. 2.5 RL improved on his first round time considerably with a 143.5-mph flight, but it was strangely sad to see just one Czech flying, and then with little enthusiasm; with M.V.V.S. designer Josef Sladkey spectating as the new piped M.V.V.S. still needs an-

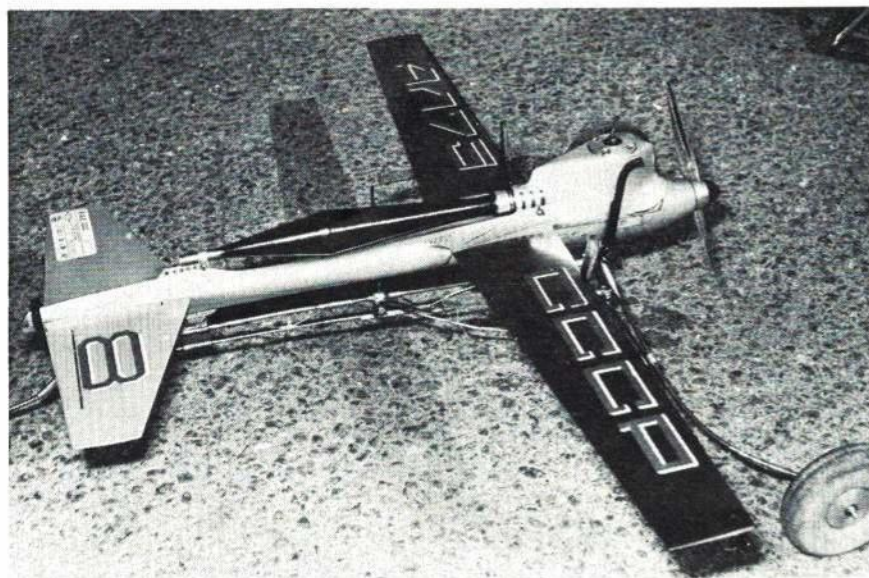
other 12 months work. Hard to watch!

In Round 3, Imre Toth managed a perfectly on-tune 145.4-mph run, with his Moki-powered model, to jump into 8th position, and Roger Theobald's Pink Lady went a little better for 150.9 mph and 3rd place, giving the Americans 1, 2, 3 positions. A. Lapinin could not get a timed run in and the other Russians slowed up. Arnie Nelson in top position, decided to fly his asymmetric Super Tigre-powered model, to show the Italians how to go. This was very stable and the very much modified Super Tigre recorded 143.5 mph without a pipe. Z. Pech improved to make 144.8 mph (the fastest non-pipe speed ever on FAI fuel at a Championship), with J. Frohlich (West Germany) turning an identical speed from a Miebach-piped M.Z.-S.T. G.15.

From observations at the Speed circles, the tuned-length exhaust pipe is clearly not a magic formula for higher speeds. Special inherent problems come with the pipe on its own, and it is interesting to note that the T.W.A. "clan" tape record the engine runs in practice so they can play them back and listen to the rpm changes in the air after the flight.

Team racing: Round 1—Everyone crowded around the circle to see Stockton/Jehlik (U.S.A.) flying against Trnka/Drazek (Czechoslovakia) and Rosler/Ilg (West Germany) in the first round of team race. The three models really contrasted, Stockton/Jehlik's looking a little rough, but highly practical, while the Czechs had an elegant, superbly finished Orion in the usual Milan Drazek tradition, and the German's just so-so. All teams started well, with the Czechoslovakians fastest in the air and pitting at 27 laps. Stockton/Jehlik were down at 36 laps and made a really fast stop. The Czechs retired at the next stop, while the Germans were having starting and cooking up troubles. Then came Stockton/Jehlik's last pit-stop. Again Herb Stockton really pulled the model out of the sky and onto the ground with Don Jehlik frantically flicking the very loose H.P. 15D for another fast stop. With the Czechs out of it and the Germans doing quite a bit of rough flying, the Americans were able to gain some precious seconds to finish with 4:26 race time—very fast for a 7cc tank and two pit-stops! After just this one race,

*Continued on page 60*



Fastest Russian speed model by Lapinin uses titanium-sheet wing, with styrofoam-filled interior. Entirely his own design, including plane, engine, and propeller.



For the second year in a row, Joseph Gabris of Czechoslovakia placed first in Aerobatics. Flew the same "Super Master" last time, too.



Something New in R/C

# Sky Mite

Using all the latest modeling techniques with foam wings, fiberglass fuselage, and balsa tail, this is a 23-powered small-size competition machine.

JERRY HIBBARD

WE are rapidly entering a new era in the R/C aircraft field. The key word is "miniaturization." Many R/C'ers are experimenting with small full-house designs and, eventually, I believe small contest and sport airplanes will be the rule rather than

the exception—perhaps sooner than later.

This is made possible by the new miniaturized radio equipment. Particularly in the last year, we have seen almost all manufacturers miniaturize their systems to a size and weight compatible with small

full-house designs. There is no longer a need to build our 45- and 61-powered aircraft.

The advantages of smaller designs are varied, but convenience and economy are most apparent. Convenience depends on the degree of miniaturization. As for economy, smaller airplanes are generally, less expensive, both to build and maintain.

The Sky Mite is the third in a series of smaller designs built and flown in the last year. All three were about the same size with wing spans from 48 to 52". All were powered by 23 engines.

The first airplane was a shoulder-wing design with shorter moments than the Mite. It performed well but was difficult to fly smoothly. Inverted characteristics were fair and the airplane did snapping maneuvers well.

I tried a low-wing design on the second airplane, using the same constant chord wing, and basically the same moments. The inverted characteristics were better, but smoothness through maneuvers was still difficult, and low speed characteristics left much to be desired.

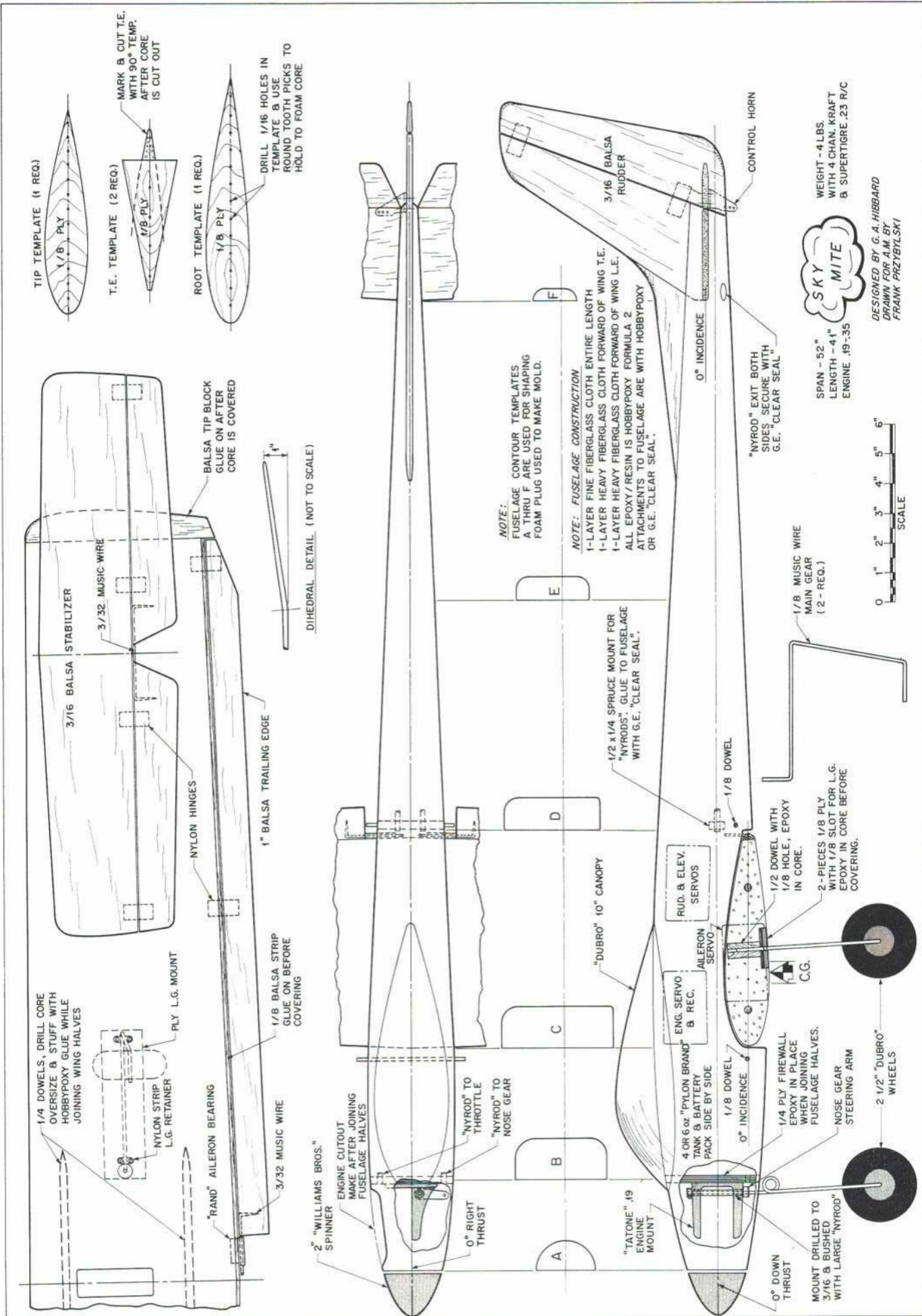
The Sky Mite is much like the second design but with two exceptions. The tail-moment was increased and the wing was tapered with a thicker percentage airfoil at the tips than at the center section. The wing has a center-section airfoil of 18% thickness which increases to 21% at the tips. The thickness of the wing remains constant from root to tip.

The longer moments make the Mite a great deal smoother than the previous designs and also allow the balance point to be moved back. The progressive airfoil,

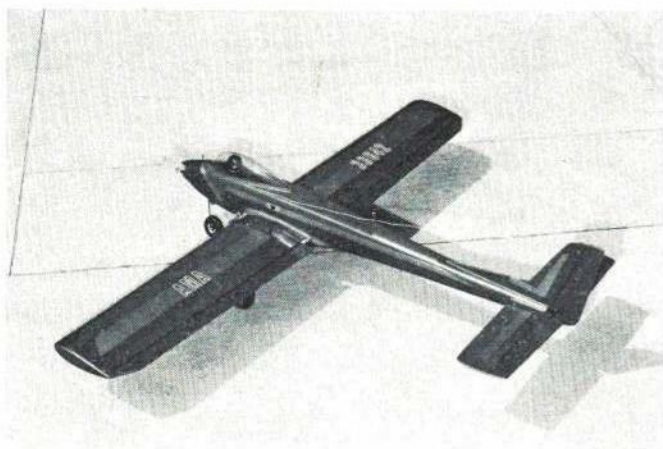


Engines from hot 19's to light 29's easily motivate the Mite. Designed for windy weather, it lands softly but has lively responses. Canopy is aerodynamically functional.

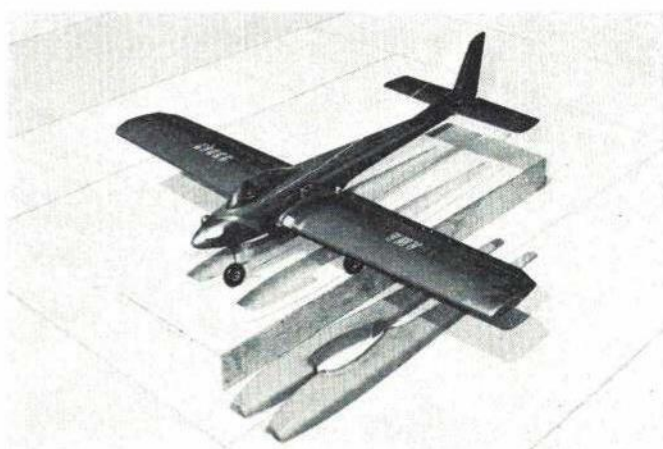








In spite of its small size and light weight, the Sky Mite is designed to fly like a big model. Ideal for close-in small-field stunting.



Cardboard-covered foam wing has constant thickness and mild taper. Section changes, and percentage increases, toward tip.

coupled with the longer moments, gives the airplane excellent low-speed characteristics. I did have some concern about snapping maneuvers when the tail moment was increased but since the balance point was moved back the airplane does them with ease. In fact, the airplane easily does all AMA and FIA maneuvers and does them well.

After flying the Mite for the last couple of months, I am convinced that airplanes of this size can perform as well as the larger designs. Maneuvers can be flown much tighter and in better view of the judges. The over-all advantages in convenience and economy will cause many modelers to turn to airplanes of this size and smaller.

**Wing:** A foam wing was used. Each panel should be cut from a 25" block of foam. Center-section braces are  $\frac{1}{4}$ " dowel as shown on plans. Landing gear mounts are made from laminated  $\frac{1}{8}$ " plywood and glued in with Hobbypoxy Formula II. The cores were covered with Chromecoat. This is a light cardboard material that is very easy to work with. For adhesive I used 3M

Sprament. Both products should be available through most larger stationery or office supply stores. Wings constructed with these materials are the best I have ever used. They are light, rugged, easy to finish, easy to repair, and very inexpensive.

**Tail surfaces:** All tail surfaces are cut from  $\frac{3}{16}$ " medium balsa as per plans. After vertical and horizontal stabilizers are cut out and sanded, they should be epoxied together at 90 degrees. Movable surfaces may also be installed at this time. The entire assembly will be inserted and secured in the fuselage as a unit.

**Fuselage:** Most modelers will agree that fiberglass fuselages have many advantages over fuselages built with conventional materials, but most will also agree that fiberglass molding is a difficult and meticulous process. First a male mold must be constructed. Then a female mold made. Finally the fuselage halves are molded and joined together.

The most tedious step in this process is the building of the male mold. Usually the male mold or "plug" must be carved from

pine or spruce blocks. This is not only a time-consuming task, but it is also very difficult to keep the two halves symmetrical.

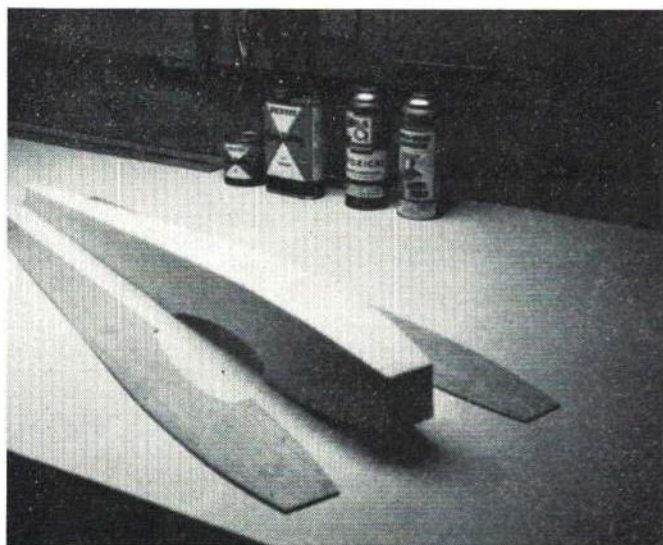
The plug for the Mite fuselage was constructed from foam in much the same manner that foam wings are cut. The entire process for making the plug, less finishing, will take about 45 minutes to an hour. The first step is making templates from the fuselage outlines. You will need two side profile templates and one top profile template which will be divided at the centerline. These templates should be cut from  $\frac{1}{32}$  or  $\frac{1}{16}$  plywood and the centerline should be plainly marked. You will also need to cut out a 2" diameter round template and divide it in half.

Select two pieces of 2" foam approximately 38 x 6" and make certain that neither piece is warped. Temporarily join the two pieces with 3M Sprament Adhesive. Mark off centerline on all sides of the joined block. The top and bottom centerlines will fall on the joint of the two blocks.

Now you are ready to mount the side pro-

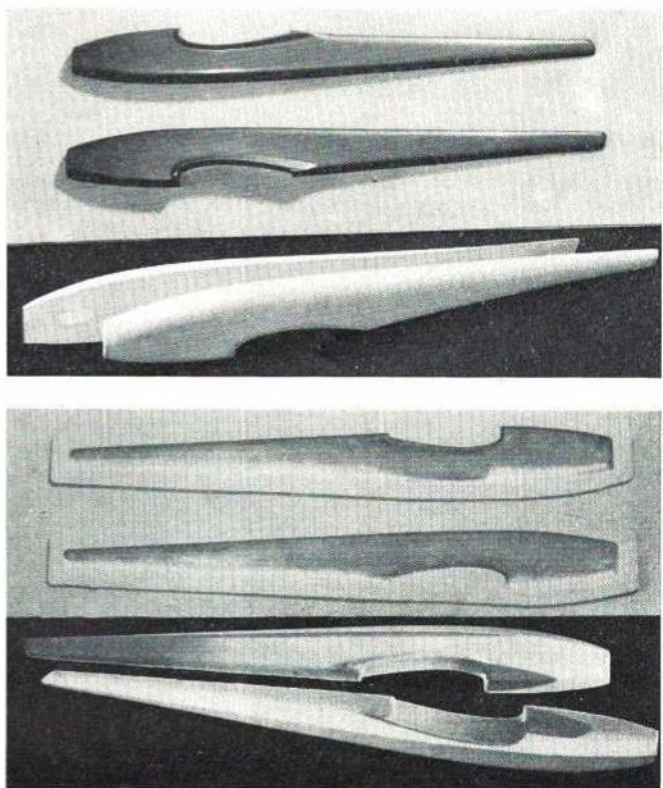
*Continued on page 54*

Simplified fiberglass fuselage technique uses common modeling materials. Construction starts with template-cut styrofoam block.



Foam block is carefully shaped, covered with paper towels using white glue, then finished to perfection and mounted on a board.

Fiberglass female molds are made from mounted male plugs. Ready-to-join fiberglass shells are made in the female molds.







German bomber buster was fast-flying quick-climbing aircraft, but could neither defend itself or maneuver easily. Drawings for 1/72-scale give direct measurements.

## Messerschmitt's Cannon Carrier

With Allied bombers swarming overhead, Germany attempted to stem the onslaught with the ME 410A-1/U4 and its 50 mm. cannon.

JOHN N. TOWNSLEY

IN May 1943, a special anti-bomber group of ME 110, 210, and 410 aircraft was formed to effectively intercept and destroy the devastating enemy bombers which were raining destruction upon the German industries.

The II/ZG 26 "Horst Wessel" Zerstörer-geschwader (Destroyer Squadron), commanded during September 1943 by Hauptmann Edward Tratt, had several of the ME 410A-1/U4's which were equipped with BK 5 cannon. The tremendous weight of the cannon plus the ammo required for it added up to over 2,000 pounds. This weight and the fact that the cannon extended so far out from the aircraft greatly lessened maneuverability, rendering it easy prey for fighter escort planes.

Hauptmann (Captain) Tratt was the highest scoring "Zerstörer" pilot of the war with 38 four-engined bombers destroyed in the air and 26 aircraft on the ground. In 1944 he was killed in an attack on a bomber formation which he foolishly attempted by "lone-wolfing" it—that fatal nemesis of so many combat pilots. Death was the penalty for his courageous attempt, but those were desperate days, demanding desperate acts from desperate men.

**Specifications:** Wingspan: 53' 7½", length: 40' 11½"; powerplant: two 12-cylinder, liquid-cooled 1,750 hp Daimler Benz DB 603A. Armament: 50-mm BK-5 cannon, 21 rounds of ammo for each aircraft. This month's model was built from a 1/72-scale Lindberg kit (#440:50) which retails for 50c each. This kit has some minor incorrect information, easy to correct, as will be mentioned later in the article.

The two-view drawing included in the article is printed to 1/72 scale; therefore, all measurements on drawing can be used in building your model. There are many ways to build the required cannon, three of which are as follows: 1) Select a piece of the plastic tree to which the kit parts were attached and file and taper to fit cannon as per drawing in article; 2) Chuck the plastic tree in a lathe and taper plastic to correct shape; 3) Chuck a plastic tree in hand drill and file to fit plan. Drill hole in end of cannon. The cannon featured on model was made by hand with a file and was not difficult to do.

### Instructions for modifications:

1) Saw off barbettes on each fuselage side so they are flush. 2) Fill openings from inside with Duratite surfacing putty and when dry, file smooth until flush with side. Repeat this process on both halves. Duratite surfacing putty is excellent for this purpose. 3) Cement windows in fuselage half. 4) File out or saw the four radiator openings or paint them flat black. (There are two on trailing edges of wing and one under each engine nacelle.) 5) Using a piece of scrap plastic, file an antenna mast to shape as there is none in kit. Check plan for size and make the mast ⅛" longer so that you can cement it to canopy after you have drilled a small hole in canopy. Four aileron balances (two for each aileron) can be made from HO railroad spikes, plus a small amount of plastic tube cement on spike head.

### Errors in kit:

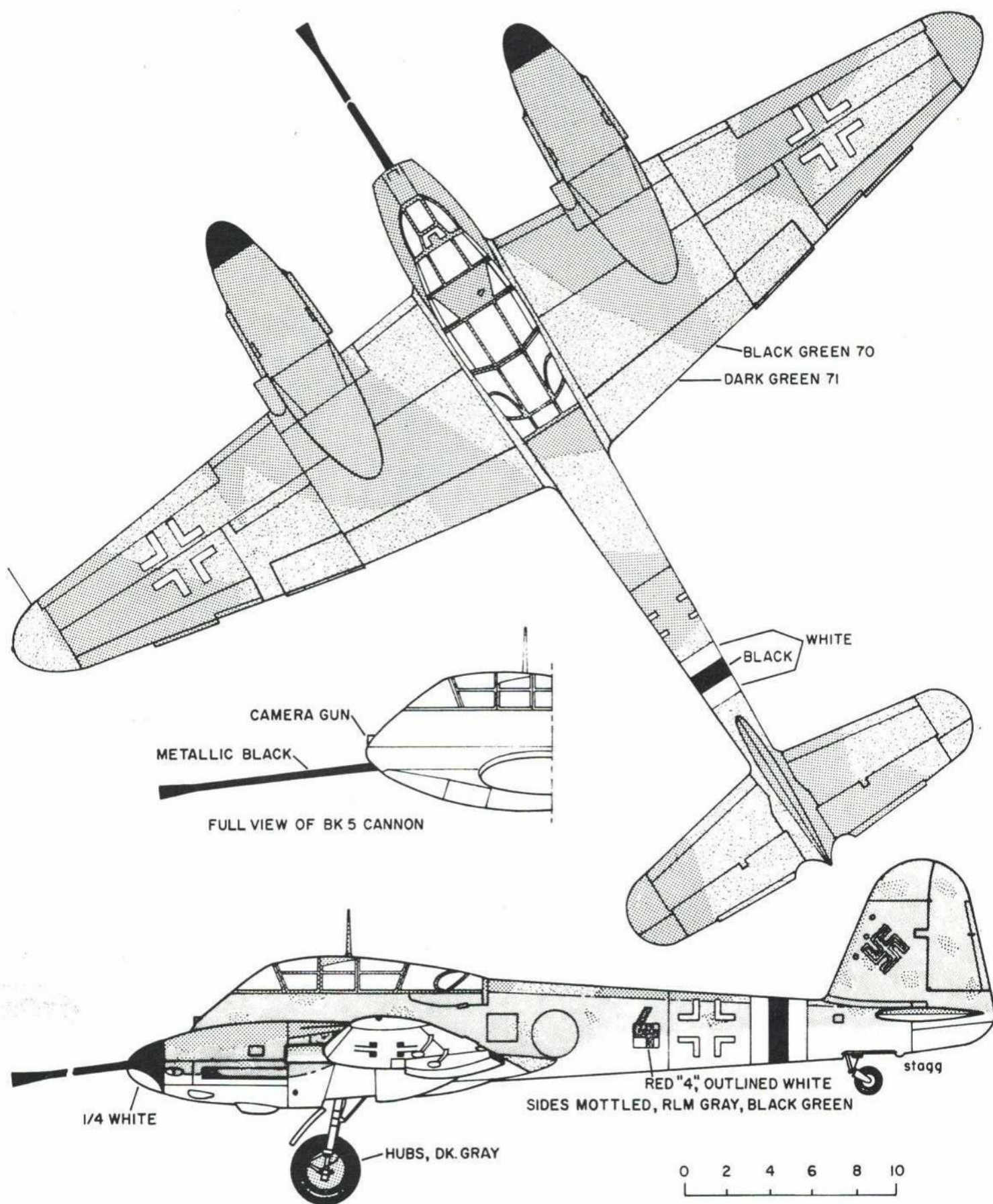
Landing gear is correct on the box cover picture, but not on Lindberg's assembly plan. To correct this, just swap landing struts: exchange left for right landing gear and right for left. Decals are for a photographic version. Location of the small gear covers (parts #26 and 27) is incorrect on the plan in kit, but correct on photos and two-view drawing of model in article.

*Continued on page 72*



Model is slightly modified 50c kit with some added details, including the 50-mm cannon. There are two valid camouflage color schemes; one on the model, the other on the drawings.





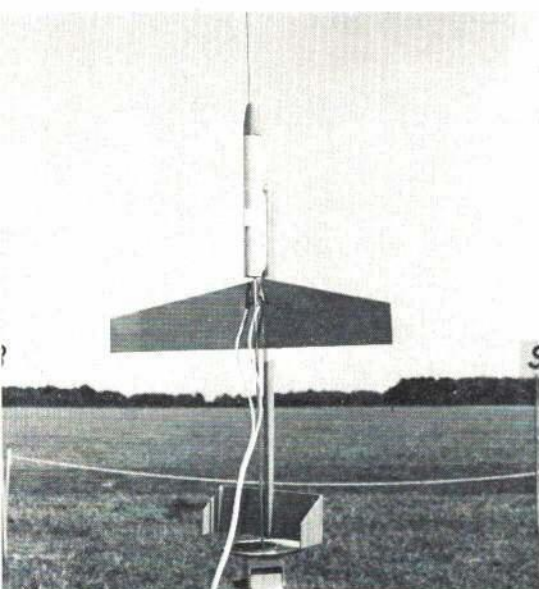
**MESSERSCHMITT ME 410A-1/U4**



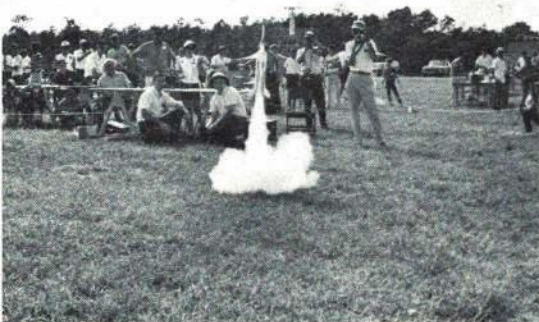
# NARAM-10



Joe Persio check-weighs a Swift class of Boost/Glide model. Prior to each flight, a rocket entry must pass a safety check.

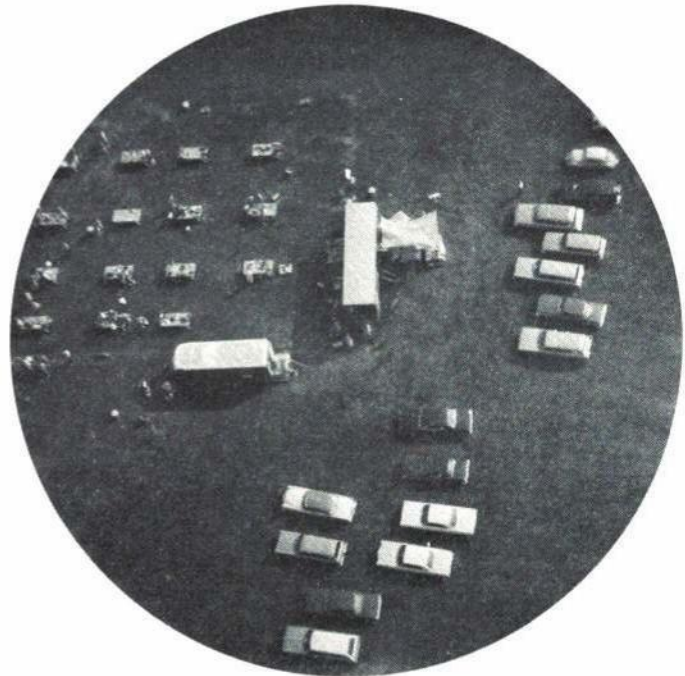


Typical Boost/Glide design is this twin-fin model. At burn-out engine pod drops off. As glider soars duration is scored.



Throughout the meet, model rocket firms demonstrated their newest products. This is Centuri's "Little Joe" launch vehicle.

NARAM-10 is the code name for the National Association of Rocketry's tenth annual championship meet, held from August 19 to 23 at Wallops Station—NASA's full-scale rocket launch facility on Virginia's eastern shore. About a hundred of the top model rocketeers from all over the country competed in nine events and three age groups. Many manufacturers were represented—both model rocket and aerospace firms—as were officials of NASA. Hundreds of exciting launches attested to the effectiveness of NAR safety procedures.



NARAM-10 aerial view shows contestant's work and rocket preparation area at left, refreshment stand and range store van in center and car park at right. This photo was made by the rocket-launched Camroc device, and courtesy of Estes Industries, Inc.

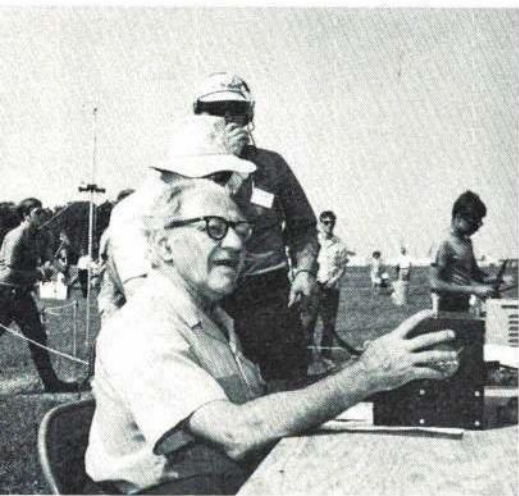


Centuri displayed 1/100th-size servicing gantry, Saturn 5, Little Joe (on gantry) and Saturn 1-B, held by Mrs. Leroy Piester.



Double-checking the igniters on their 1/45th-size Little Joe, is Centuri's Leroy Piester (at right) and Wayne Matson.





Willie Ley, renowned rocket scientist and a NAR Trustee, manned the launch control station during parachute duration flights.



Scale rockets are popular and flyable too! Vern Estes of Estes Ind. displays their Saturn 1-B which uses four C6-5 engines.



Each of three launch sites had six firing points as shown here. Ignition current supplied from the launch control station.

# model rocketeer

NATIONAL ASSOCIATION OF ROCKETRY

1239 Vermont Avenue NW, Washington, DC 20005



## LOCK UP THOSE COUNTDOWN FEATURES

In a move to give rocketeers the opportunity to publish technical and feature items as well as "the story of their section," officials of this magazine have decided to discontinue Ye Olde Rocketeer Stine's "Countdown" column. Like his "Handbook of Model Rocketry" which became the mainstay of thousands of model rocketeers, NAR sections, local clubs and those who use it for reference purposes, it is expected his published works in this publication will become much-sought-after historical items.

Now the full challenge of not only carrying on G. Harry Stine's platform for launching model rocketry but also the challenge of presenting valuable, interesting material begins. Everyone who recognizes this challenge and feels he or she has a subject and photos, art or plans, is encouraged to contact William Winter, Publisher and Editor. Specifically, he is searching for fine examples of "construction articles and plans from the more knowledgeable members of our NAR organization."

An idea which might be considered, but not to dampen individuals with talent, is to make this publication of your best material a "project of your NAR section," designed, constructed, tested and launched into print by a select committee. Keep in mind that the magazine requires several months to consider and process each item submitted.

## PASSED UP NARAM-10 COMPETITION?

Some sections missed their chance to send top-notch rocketeers to the Tenth Annual National Association of Rocketry Aeromodelling Meet at NASA's Wallops Island station, Aug. 19-23, simply because they overlooked the importance of charter renewal. Take a close look at your section's charter date; renew in advance and plan all local and regional competition toward preparing section members for their chance at NARAM-11 in '69.

On this same subject, section advisors and officials are reminded that members not having an up-to-date card and who continue to fly rockets in section/region meets can void your insurance policy.

## 4TH ANNUAL PITTSBURGH SPRING CONVENTION

March 1969 marks the fourth year that NAR's Steel City Section plans to host its Spring Convention. Countdown in August '68 AAM called it a Technical Meeting, which is more appropriate. Over 200 model rocketeers attended discussion groups on boost glider technology, research and development, construction techniques, scale modeling, model rocket math, and working in clubs.

This is where you rocketeers really have a rare chance to get in on the ground floor of the state-of-the-art of the aerospace hobby-sport. This is where you meet pros, pick up new angles, inspect new kits, etc. from the manufacturers which have supported the convention annually.

## 2ND EASTERN CONVENTION WAS SUCCESS

Last March 29-31 rocketeers who could make the trip, attended M.I.T.'s Technical Convention, aimed at persons in the senior high school and college undergrad level. Technical discussions surrounded the often tedious, patient approach; advanced, serious modelers investigated areas of model astronautics not yet explored.

Their work and published reports, which easily results from months and sometimes years of research and testing, fill the gap in our ranks created when younger rocketeers step into adult life. As it is, very few have dedicated their obvious talents in this area.

This convention, hosted by the M.I.T. Model Rocket Society, also included the launching of 50 different models at the same site used for NARAM-5. Here's an area where other sections can get in the act, carefully plan a convention, especially if your section is at the other end of this nation. If past experience counts, your least worry would be attendance by modelers, manufacturers and NAR officials.

Plan on hosting a region/national convention? We suggest you write to either the Steel City Section or M.I.T. Model Rocket Society for their plan of action. Lastly, send your courtesy copy letters to NAR Hqs., our NAR president and other officials concerned who may be asked to speak, act as judges or inspectors of models, and in general support your program.

## SUGGESTION FOR THAT R&D PROJECT

Here are some basic tips suggested for you to follow when planning a Research and Development project:

- Locate info on what others before you have done; use your library, and consult other rocketeers and the companies originally involved to establish all aspects of the project.

- While doing this investigation, keep extensive records of your progress and details.

- Consult others and analyze their combined criticism. Have those who have not been connected with the project study your preliminary written report and correct it where necessary.

- Allow ample time for failures as well as success. Some failure is almost certain to occur at the worst possible moment in an R&D project.

- Never, never, test alone. Reasons are obvious. A second person assists with test instruments; others help analyze results, substantiate observations/facts, and aid in case of emergency.

- Avoid the possibility of over-analysis. Should your initial facts fail to prove your theory, you will need more facts.

- Lastly, write a factual, complete report that includes a statement of the problem, your approach, apparatus used, explanation, sufficient data and conclusions.

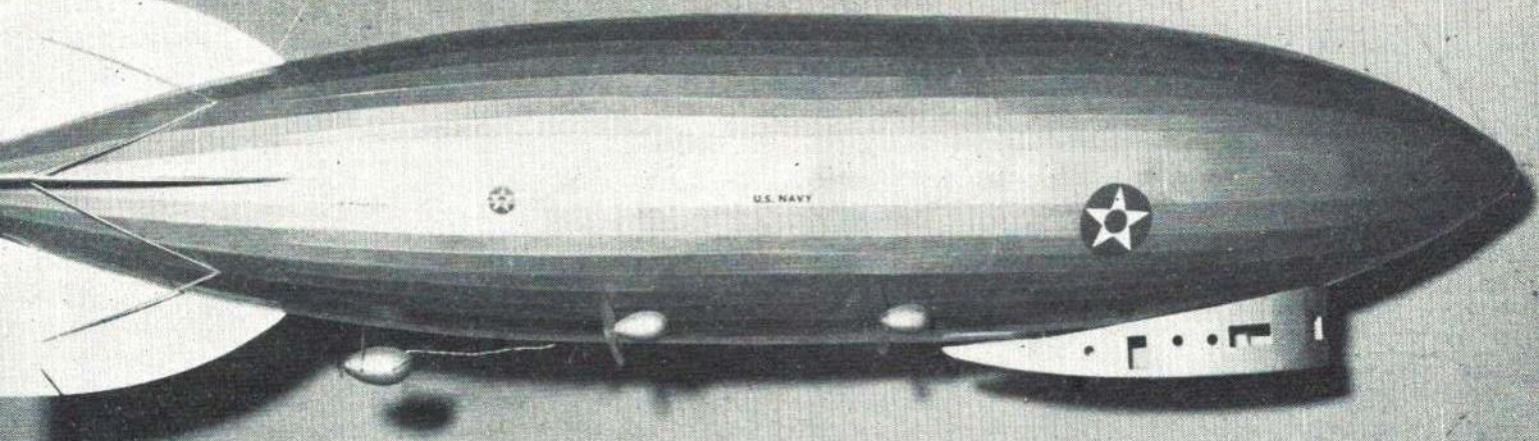
(Credit: *Impulse*-May-June 1968, Pascack

Continued on page 76









# R/C 'Los Angeles'

Patterned after a famous airship, this model can be made smaller or larger. Use data given here to build your own dirigible.

JOHN A. WICK

ON October 15, 1924, as a war reparation payment, the German Zeppelin Airship Works delivered to the United States the ZR-3, later re-christened the "Los Angeles." This 658-foot dirigible had just completed a 5000-mile flight from Friedrichslafen to Lakehurst, N.J., and this was just the beginning. The ship logged a total of 4,320 hours in 331 flights, before being decommissioned at Lakehurst in 1932 and scrapped seven years later.

Today, jet aircraft are so commonplace that most people won't spare an upward glance. On the other hand, it would be most interesting to observe public reaction to a silver cigar-shaped object almost three city blocks long, flying, or should I say sailing, overhead. It is indeed sad to note the passing into another time of the giant airships, but the long record of tragedies associated with their existence, doomed them to extinction. The final curtain of dirigible development fell when the Hindenburg unexplainably burst into flames and was completely destroyed with a loss of 36 lives while attempting a mooring at Lakehurst in 1937.

Regarding the model, I had always kept the thought of constructing a working model of a dirigible in my model building itinerary. Finally construction began with the success or failure reported herein. It seemed logical to me that if an aluminum structure was used on the original airship, a careful substitution of balsa would be both strong and light enough to maintain a lighter-than-air condition.

The ship is built on a  $\frac{1}{8}$ " sq. crutch in the half-shell fashion. The most difficult part of the construction is in the aligning of the first four stringers. Once these are glued in, the structure will take on a little strength. After gluing in half of the bulkheads, and while still on the board, add three temporary  $\frac{1}{16}$ " sq. braces between each of the bulkheads. After adding bulk-

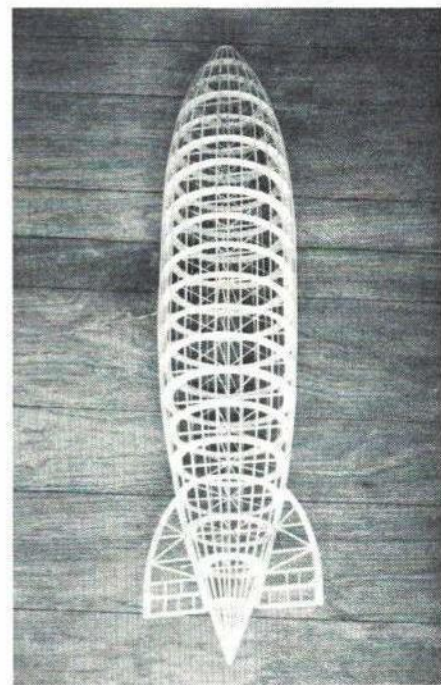
heads to the other side and installing these temporary braces, the structure may be suspended from the rafter and the stringers may be installed, to each side. The structure will be strong enough to work on normally. Many less experienced modelers have added stringers to a half-shell while still on the board, resulting in a bowed framework. This would be most noticeable on the dirigible because of the larger than usual size of the ship as compared to the smaller than usual size of material used in the construction.

The gondola is constructed on the ship before it is covered with silk to insure a good fit. Two pipes of  $\frac{1}{16}$ " aluminum are epoxied in; one is a filler, the other a vent. The main fill tube is located in the gondola, which is made oversize to contain an Otari-on receiver and escapement. The small electric motor in the rear pod drives a pusher propeller which just barely moves the craft. The initial filling of the ship with helium resulted in a collision with a sharp rafter projection, and down it came. After patching and refilling, a successful flight was made across the living room. In about five minutes the ship slowly settled to the floor. It was clearly evident that the dope covered silk would not hold helium. After some heavy concentration, we thought perhaps two coats of hot-fuel proofer might work.

This application rendered the envelope leak-proof and many short flights were made. By the addition of varying amounts of clay ballast, neutral trim could be maintained and with the power on a slight climb was evident. The original model is 56" long and weighs in at 11 ounces. It will lift approximately eight to ten ounces of radio gear, depending on the existing barometric pressure. A larger craft of six to seven feet length is planned for the future, utilizing three-channel R/C gear. These model airships are designed for in-

Perhaps a dirigible is your bag? Helium supports it, electric motor pushes it, and rudder-only by escapement steers it around.

Lattice-work of stringers makes it a true airship. Structure is quite similar to the real Los Angeles. Light and durable.



door flying exclusively because, like their big brothers, they would be subject to the slightest breeze and, if one did overfill or hook a thermal, it would probably result in the longest model chase in history.

One indoor flyer suggested that it would make an excellent indoor model retriever. With more experimentation on the project, he may be quite correct.

**Dirigible specs:** Overall length is 53"; maximum diameter 11 $\frac{1}{2}$ ". Airframe weighed 13 oz. less the R/C gear. Entire hull is sealed in order to allow maximum room for helium. Covering is silk with six coats of dope and fuel-proofer to seal against loss of helium (this gas will leak

*Continued on page 75*



*An editorial 'Progress we must have—but  
not at the expense of bankrupt model suppliers!'*

MOST modelers do not realize the havoc that sudden rules changes can have among the manufacturers whom they rely upon to supply their engines, plane kits, even some types of accessories. Such disastrous changes can—and have—taken place in R/C competition rules, and in rules for many other AMA model flying events. We are not sure if it has ever happened, but such a change could very well force out of business one of our respected—and much needed—manufacturers.

Engine makers have been among the worst sufferers since they often have much money tied up in development of a new engine, and often may have a large stock of such engines on hand. Suddenly, the AMA rules are changed—possibly for very valid reasons (at least to the AMA Contest Board members)—and our engine maker finds all his development gone down the drain, and his stock of fine new mills virtually useless. This isn't just a possibility—it has happened several times!

Perhaps there has been lack of communication on both sides; closer liaison between manufacturers and those who make the rules might detect early trends that will inevitably lead to rules changes in the not-too-distant future. Aware of such trends, the manufacturer could hold off on heavy development or tooling expense until he was sure which way the trend would lead. AMA headquarters and CB members are probably most aware of these groundswells that might possibly lead to radical rules changes. Perhaps the manufacturers could work with AMA through their various organizations—the HIAA and the RCIA. Such cooperation could be helpful to all concerned.

Rules changes we must have, of course. Equipment changes and new techniques are one reason. Likes and dislikes of the modelers are another. No one will argue against the theory that what the competition flyers demand—and usually get—is what all the sport and non-comp flyers are going to have to use. Engine-size categories are one prime example of this. Rapid development of very reliable multi propo (and before that, of trustworthy multi-reed apparatus) is just one example. Competition flyers forced these developments, but the vastly larger group of sport flyers are the real beneficiaries. But sudden overnight rules changes of a radical nature are the

ones we must guard against. Could be that our rules making groups should give a bit more consideration to just who the changes might hurt—or might even force out of our field.

Manufacturers are not the only ones hurt by sudden rules shifts. Give a thought to the hobby distributors and the dealers themselves, who might have on hand a large stock of kits, which could be made obsolete overnight by a sudden rules change. So far we doubt if this has happened in the R/C field, but it certainly has in other competition categories.

Suppose you take just our own field of competition. Plane designs had gotten up to pretty large size, in order to carry the 10-channel reed apparatus (we are thinking back to the variety that required 10 relays too). Meanwhile, the flyers were putting better finishes on their planes—all of which added up to the need for larger engines. Our maneuvers required more power to complete smoothly and successfully. Engine sizes went up from the 35's that we had had for years to 45's, then 50's, and eventually to 60's. While this was going on, we progressed to relayless reed gear, which saved considerable weight. Then into propo of the older "large" size, and now we have full-house systems with plenty of servo power that weigh a pound or less, and can fit easily into much smaller planes. We anticipate that R/C planes of the competition variety might be headed on a downward size trend (though this wasn't evident at the recent Olathe Nats).

Most modelers agree that the 60's—even the "smoothest" of the crop—tend to shake a model and its equipment to pieces. Also, these big engines are fuel hogs! We now have the radio equipment and know-how to produce very successful competition stunt models that can fly fine with engines in the 35-40 cu. in. sizes, possibly even smaller. It's too early to say whether R/C Pattern comp planes will show such a trend next season. But the point here is that an engine maker should check most carefully into this possibility, before launching heavy development on a new .60 engine! This is simply evolution, of course. We doubt if 60-powered stunters will be ruled out of competition for some time to come... but if they *were*, think of the number of manufacturers, distributors, dealers, even the model builders themselves, who would be seriously affected!

It seems to boil down to a need for closer contact between rules makers and those who produce equipment to operate under these rules, and more understanding on both sides of the present needs and trends in the fields in which both operate. Progress we must have—but not at the expense of bankrupt model suppliers!

—Howard McEntee



Roger Breedlove modified the Jester biplane from March '67 A.M. article by Ken Bonnema to have full-house controls, with ailerons and slightly increased wing area. Plane comes to life in Free Style and Class C maneuvers.

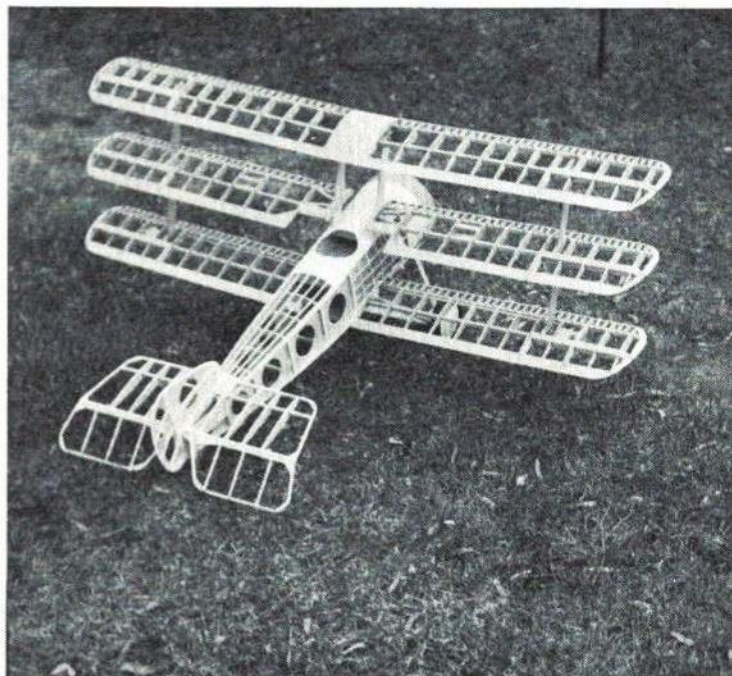


CONDUCTED BY HOWARD MC ENTEE





Ed Yulke's attractive scale model of the WW I-vintage Sopwith triplane is powered by an inverted Super Cyclone (remember?) on glow, has coupled rudder and six ailerons.



#### Technical Notes

**Swedish skis:** Another "winter item" for you cold-weather enthusiasts. This comes from Tom Ekstrand (c/o Tyborg, Kristinehojdgatan 5, Gothenburgh, Sweden). He used to pack up his R/C planes when cold weather came—but no more. Noting he is not a highly experienced pilot, Tom says he found the Sterling Piper Cruiser slow and forgiving enough for his needs. It performs nicely, but had a severe ground-looping tendency on wheels—partly overcome by moving the land gear  $\frac{1}{2}$ " back. On snow there is no ground-looping problem, and takeoffs are a pleasure. The skis shown seem ideal for the 2" scale Piper.

The  $\frac{3}{32}$ " waterproof ply bottom pieces and the center strips are fastened together with small wood screws, then the forward third of each ski is dunked for about an hour in boiling water. Remove from water, wipe off the surface, separate the two pieces and apply Hobbypoxy II to the full-length underside of the narrow strip, then join the pieces again. Lay the ski assembly on a thick pad of newspapers, and bend the tips upward—you will be surprised how easy the bends can be made. Block up the tips to desired height and put a heavy weight as indicated by "plastic box" on the drawings. Try to get the curves equal in both ski tips, and be sure the tail portion is flat on the newspapers. Allow 24 hours drying time.

When you bend up the tips, the screws may "angulate" a bit as Tom puts it, but this is not harmful. Also, the screws can protrude through the bottom a bit—they will be smoothed off later. After drying, smooth and shape all over, then paint the entire skis with Hobbypoxy II. Attach the L.G. fittings, the nose wire and rear tension rubber, and fit onto plane. Tom suggests the nose wires should be adjusted so the tail wheel just touches the ground lightly. The skis then have a slight negative incidence angle in the air. If the plane tends to nose over on landings, increase size and tension of rear bands. Give the bottoms of the skis a good coat of regular ski wax. Landings should be very smooth—snow is much softer than hardtop runways!

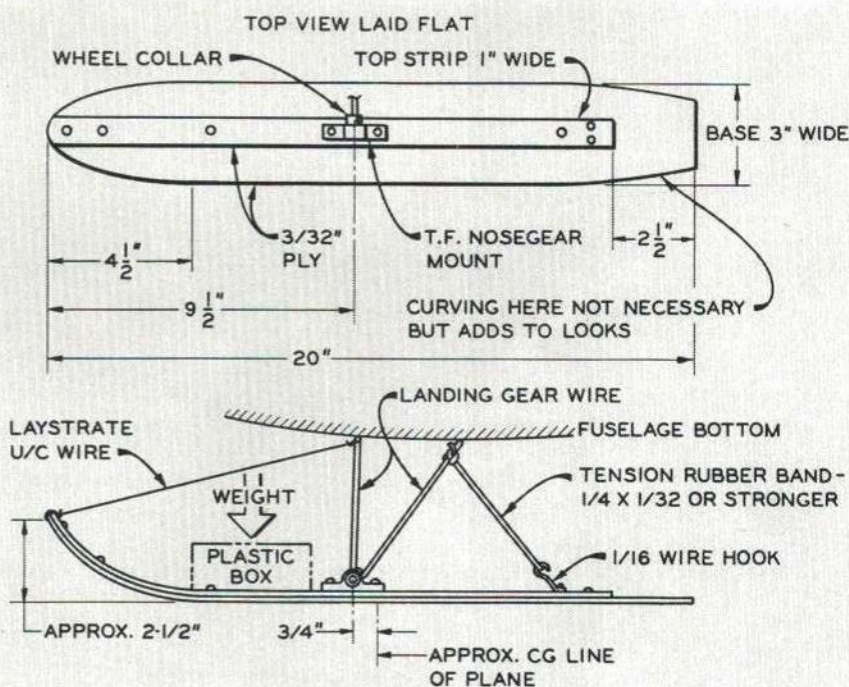
**Analog servo:** A combination of ideas by Bob Hooper and Ben Givens (11717 Fulham Rd., Silver Spring, Md. 20902) resulted in the servo seen here, which has proven to

have much better resolution than many commercial units. Compact and light (about 1.8 oz.) it has ample power to move large control surfaces, but current drain is low. Idling drain is around 25 ma, and maximum current drain depends upon how tight the clutch is set; normal clutch setting will slip at around 200 ma. This light and potent servo should be ideal for gliders, and smaller power planes.

The mechanical work starts with removal of the yellow triangular piece, the centering spring and the pivot pin for the triangle. The pin hole is then carefully enlarged to fit the shank of the feedback pot, which is an Allen-Bradley or Ohmite  $\frac{1}{2}$ W linear-taper unit of 10,000 ohms value. If you have the right size of tap, the hole

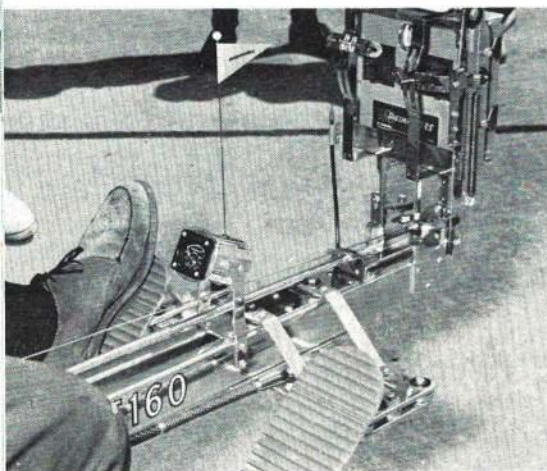
might be threaded; however, Ben simply opened it to  $\frac{1}{4}$ " dia. and attached the pot with epoxy cement. The pot bushing and shaft must be modified per drawing.

Remove the C-washer that holds the shaft in place, then cut the bushing so it is flush with upper surface of the servo base. Ben made the cut in a lathe, but careful hack-saw work should do the job. The shaft should be cut down as shown. The pot need not be dismantled for this work, if you use care. A shaft extension is made from the metal insert of a James Millen knob (Allied cata. #43H253, 254 or 255). This clamps on the shortened pot shaft, and the yellow triangle is pinned to the small end. The yellow washer goes between base and the extension (enlarge its center hole



Carefully designed plywood skis used in Sweden by Tom Ekstrand allow normal model flying operations during winter. Interchangeable with two-wheel landing gear systems.





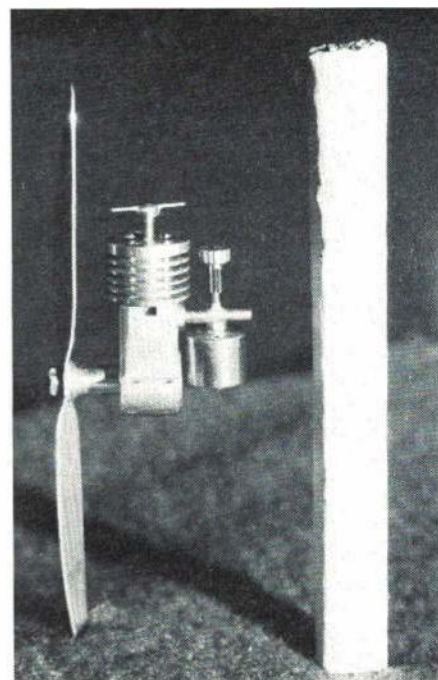
Above: Miss Model Aviation 1968 tries out Ed Henry's unique "Fly Seat" at Nats. It is a rotating model-flying cockpit which manipulates the transmitter through levers, yokes, and pulleys. Said to respond exactly like the controls of a real plane!

to  $\frac{1}{8}$ " dia. and file off the "crescent" on one surface and the projecting pin on the other; it holds the segment gear down, so the gear teeth stay in mesh. The yellow triangle should be about the same distance above the base plate as it originally was (possibly a tiny bit more) but will now be inverted. Make sure the slot in the triangle does not bind on its metal "spool" at neutral; you may have to lengthen the slot a bit. When you are certain all parts fit and move smoothly, epoxy the pot permanently in place.

Build the amplifier on a scrap of P.C. board, epoxied to the bottom of the motor cover. Ben used  $\frac{1}{4}$ W resistors, but  $\frac{1}{8}$ W size would allow more room. The PNP output transistor is rated at only 200 ma current, might be marginal for heavy loads; the NPN unit has an 800-ma rating. R1 is an optional "protective" resistor. R2 and R4 are varied to set the maximum range of servo travel; they should be such that the half-gear never reaches its stop positions with maximum voltage input to the servo amplifier. R3 is the 10K feedback pot, shown linked mechanically to the drive motor. R5 is the "damping" resistor; 15K is about optimum, but it may be changed to suit.

When first adjusting the pot movement, the setscrew holding the shaft extension (and attached triangle) may be loosened to get the exact setting desired. It is wise to shock-mount these servos—use soft rubber grommets at least—especially if they are to be employed in a powered plane.

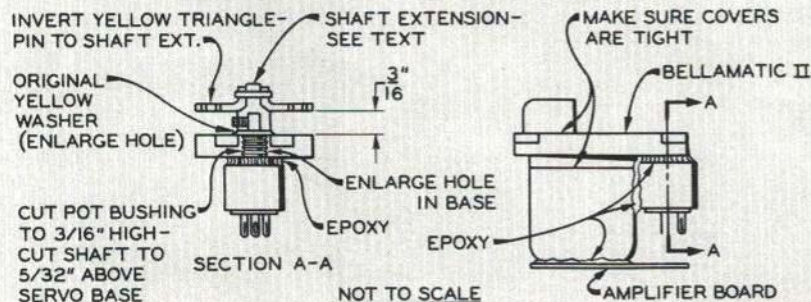
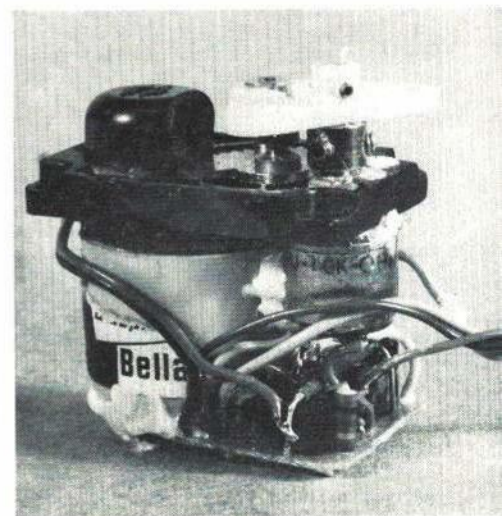
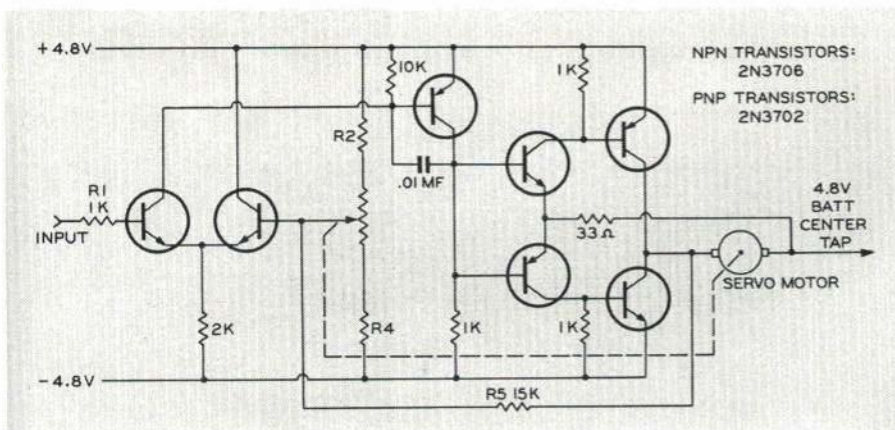
**Those 72 mc figures:** Some question has been raised on the figures we quoted from an FCC publication on the power input and output of current 72-mc transmitters, this space, September issue. Citizen-Ship Radio Corp. feels the figures put their transmitter in a rather poor light relative to other units listed. It must be pointed out that the figures are those submitted by the manufacturers themselves—not the result of tests that the FCC makes on the transmit-



For his R/C miniature planes, Dave Robelen may have designed what is the world's smallest operative model engine. A diesel of .0015 cu. in., it weighs under 4 grams!

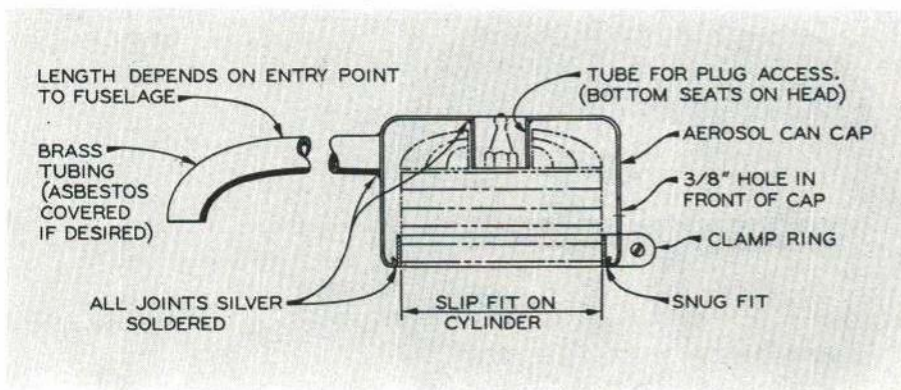
ters. This is just the way of things.

As C-S notes, as long as the figures (particularly the power input) doesn't exceed the FCC specified maximum, the Commission has little other interest in them—and cares not at all about the power output as long as it does not exceed the specified .75W max. C-S further notes that most manu-



The drawings and photo above show the small, lightweight analog servo developed by Ben Givens and Bob Hooper. It features the Bellamatic servo mechanical parts, simple amplifier with few components and low cost, operation with any analog system, the highly geared-down and responsive Micro-Mo motor, and low-low current consumption. Feedback pot is modified  $\frac{1}{2}$ -watt hard-ceramic unit of infinite life. Servo should be ideal in small powered planes or any R/C glider. Can be used with the many home-builder's feedback pulse systems. Amplifier useable with other pulse servos.





An interesting solution to the problems of equipment instability and poor battery performance in very cold weather is the heat

cap over the engine cylinder, as used by Hank Pohlman. Warmed air is ducted into fuselage. Note the ski on nose gear.

facturers are using about the same circuitry, and that 25% output is about the maximum one can obtain from a given input at these frequencies.

We could mention several more points. Some designers prefer to use a very potent transmitter (relatively high power input) and a rather "dead" receiver; this has the advantage of less receiver susceptibility to interference from within or without the model—but it also means high drain for the transmitter battery, resulting in either a shorter battery life between charges, or need for a heavier-duty battery in the transmitter. With a rather low-power-input transmitter, one needs a rather sensitive receiver. Which way one goes is a matter of compromise and design philosophy. Apparently C-S has gone the latter route—but we hear no complaints of unusual receiver interference pickup with this equipment, so apparently a good compromise between transmitter power input (and output) and receiver sensitivity has been attained in this line. We will be happy to air comments from other 72 mc equipment makers on this matter.

**Learn metric:** The U.S. may soon be one of the last holdouts against the metric system of measurement—and will probably eventually have to change over to it, to match the rest of the world. We learn from George F. Kite (511 Rosslyn Ave., Springdale, Pa. 15144) that an 11-page pamphlet is available from the Metric Assoc. Inc. (2204 Ash St., Waukegan, Ill.) for 15c, giving a history of the metric system, comparison tables of units with the American system, plus many references. Ask for "Metric



Talented 14-year-old Mike Sansong displayed a beautiful Kawasaki Hein which he built from a Japanese kit. Detailing includes all riveting, camouflage, and complete cockpit. Flown with rudder, elevator and motor control.

Units of Measure." It is well worth it.

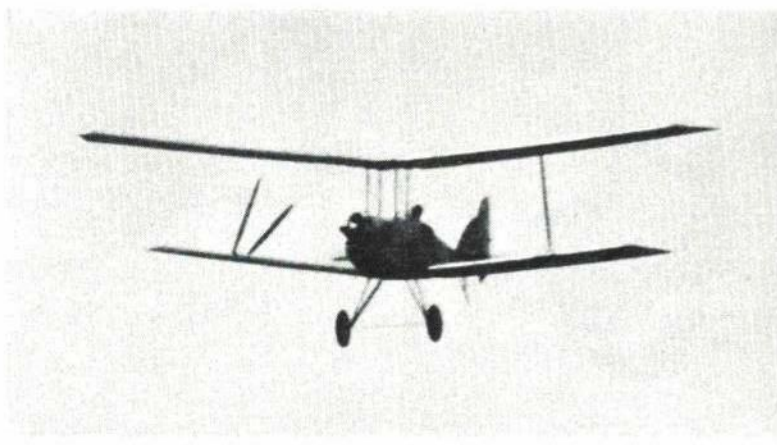
**Tiny Diesel:** Designed and built expressly for indoor flying by Dave Robelen (17 Catalina Dr., Hampton, Va. 23364), the tiny power plant is dwarfed by an ordinary cigarette (photo by Dave Hamilton,



Can you imagine a float-plane glider? George Wilson's glider does quite well and ROW's on a long tow line. He just put Gee Bee floats on a German Kurwi 33 R/C sailplane. Scene is at New England All-Hydro R/C meet.

Grafton, Va.) has .100" bore, .150" stroke, a displacement of .0015 cu. in. and weighs just under 4 grams (about 1/4 oz.) including the metal prop. When we saw the engine it had not been run, and Dave is seeking

*Continued on page 76*



An accident about to happen! A WW I BE-12, now on its eighth season of active flying, was launched with loose starboard wing struts. The builder, Robert Carlisle, tried to catch it! He didn't. Fell to earth harmlessly, was reassembled and flown again. Durable.





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Ace R/C Inc.

# ACE R/C

SERVES YOU FOR ANY R/C NEED

SERVING YOU SINCE 1953

## NEW!



## COMMANDER DE SUPERHET RECEIVER

This is the first superhet receiver to be produced by Ace R/C! And it is a first in many respects: Small—measures only  $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$ "! Light-weight is about .6 ounce; Relayless—but double-ended (DE) with 1 amp transistors in output for hookup direct to dual coil actuators; Low voltage—works reliably at maximum range on just 2.4 volts; Versatile—works with most any transmitter of from 400 to 1400 hz; Pulses—exceptionally fast.

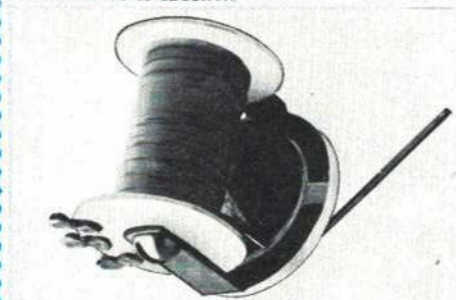
Manufactured by Ace exclusively under license agreements with designers—several circuit breakthroughs found only in this unit.

Works with only minor change on Dickerson Skyhawk GG Conversion kit. Uses highest grade miniature components—completely assembled, tested and guaranteed.

Not only is the Commander the smallest and lightest superhet available today—it is also the lowest priced at this special introductory offer.

No. 12K1—Commander DE SH RX  
Assembled .....\$26.50

(Available on 26.995, 27.095, 27.145 and 27.195 mHz. Be sure to specify.)



## ADAMS SINGLE AND TWIN ACTUATORS

Adams Baby Actuator—smallest dual coil made. Only  $\frac{1}{2}$  oz. Only .....\$6.95

Other Adams Actuators in low voltage coils in both single and twin magnet assemblies in stock. LV Single \$6.95. LV Twin \$9.95. Improved!

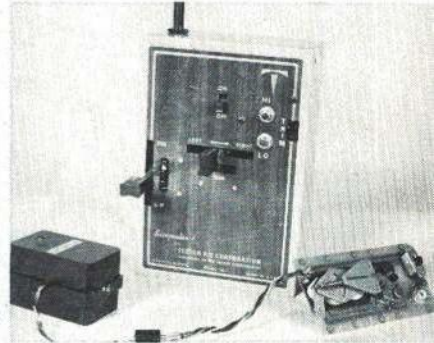
ACE

## Accessories Components Equipment

Whether it's Tuffline fuel tubing, or a 2/56 x 1 machine screw, or an item from almost any major manufacturer, the chances are good that Ace has it in one of the most comprehensive lines of Accessories, Components or Equipment available anywhere. Our own designer-approved radio kits are added to by lines from E. Bonner, Lanier, Midwest, Bee Line, SPL, Cover Jensen, Rocket City, Su-Pr-Line, Sterling, M. Enya and Webra, etc., etc., etc.

## NEW!

## DICKERSON—TESTOR CONVERSION KIT



Although intended primarily to convert the Testor Skyhawk to GG operation for rudder actuator (motor if desired), the kits below are among the most versatile ever offered.

The plane conversion kit will give GG for the Skyhawk, but also may be adapted for airplanes up to .19 power! May also be used with almost any other type of receiver—relay or relayless.

## RECEIVER CONVERSION KIT

The Dickerson conversion kit for the Skyhawk receiver utilizes some of the components already in the unit, but adds a switching decoder to convert signals for a Rand LR3. Kit consists of PC board for housing switcher, LR3, switch and charging jack on a  $2\frac{1}{4} \times 4\frac{1}{4}$ " deck. Contains all transistors and resistors. LR3, connector, switch and charging jack are not supplied.

No. 15K53—Dickerson Skyhawk Rx Conversion Kit, \$11.50

## TRANSMITTER CONVERSION KIT

While foregoing may be used with any GG transmitter, this kit makes the conversion of the Testor Simpulse Tx into a two stick GG transmitter easy and simple. Only hand tools required. Basic kit contains all pots, brackets, extra stick assembly (SPST push switches motor available as extras.)

No. 11K5—Dickerson-Testor GG Tx Conversion Kit, \$11.50

No. 30K3—SPST push switch for motor control (2 required) each, \$.45

## TESTOR RX CONVERSION PC BASE

Printed Circuit base for plane and receiver conversion is available separately for the scratch builder.

No. 28K75—Dickerson-Testor Rx Board, \$3.25

## NEW!

## TRANSMITTER SIGNAL STRENGTH METER KIT

Would you like to add a signal strength meter to your Jansson or Commander or almost any R/C transmitter that does not have one built in? This simple Ace kit, while designed primarily for the Jansson transmitter, can easily be adapted to any transmitter that allows just a bit of room in case.

The S/S Meter Kit monitors the RF going into your antenna and is a reliable indication of signal you have from your transmitter.

Simple to install: All components mount on meter except for connections to antenna and case. Kit contains all components, including instructions.

No. 22K17—Transmitter S/S Meter Kit.....\$4



## PULSE COMMANDER

### COMMANDER PULSE TRANSMITTER

The Commander Pulse Transmitter is designed expressly for magnetic actuators. Unlike most GG units, which are difficult to convert for Rudder Only, this unit makes effective rudder control with magnetic actuator possible by a width variation of 95/5 instead of the usual 65/35 ratio. Engineered as a complete package, this is not a conversion unit or add-on.

RF section uses powerful silicon transistors. Pulser section uses stable unijunction. Has an electronic centering adjustment to fit your installation in the airplane. Once set, does not require readjustment or constant trim adjustments.

Housed in exclusive Alumina-Sheen anodized-finished metal case measuring 6 1/2" tall x 3 1/2" wide x 2 1/2" deep. Uses large 9 volt battery of the M1603, D6 or 276 types for extra long life. Has base loaded antenna which collapses to 9 inches. Nicely balanced for easy-to-fly feel. Spring loaded stick is internally mounted.

Designed expressly for the Commander DE Superhet receiver. With 2 nickel cads and an Adams magnetic actuator, this makes an ideal beginners package.

Quality throughout, rugged reliability, custom crafted; completely assembled, tested and guaranteed.

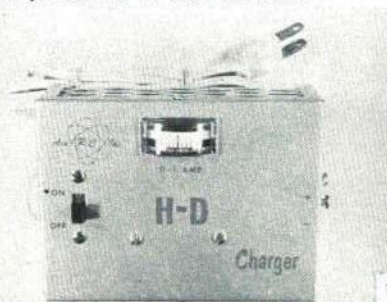
No. 11K1—Commander Pulse Transmitter \$39.95  
(Specify frequency: 26.995, 27.045, 27.095, 27.145 or 27.195)

### DECODER KITS

Ace has the American Modeler featured Simpro III kits, which allow you to go to decoder action for GG with two actuators for less wiggle, more power. Also kits for the Rand Switchers and Decoders. Full details in our 1968 catalog. (NOTE: Decoder systems require faster pulse rate than ordinary GG systems.)

COMING SOON!—Don Dickerson's Dual Dittor low cost all transistor decoder for use with Rand actuators; a Micro Decoder Center which is all solid state including Adams actuators for completely inter-action-free flying. Also the Radio Control Modeler Decoder which will be featured soon will be available in kit from Ace.

Watch our ads for details—or better yet get on our mailing list by sending us an order! Free catalog supplements AND R/C Data—acclaimed by do-it-yourselfers all over the world



### NEW! H-D CHARGER

The H D refers to Heavy Duty—and that's exactly what this brute is—capable of charging your larger nickel cads and wet cells. For rates of 100 ma up to 1 amp. Has meter for monitoring and for setting of charge rate. Not dual purpose, but made for those husky charging jobs where you need the power. For nickel cadmiums from 1.2 to 10 ampere size. Will also series charge transmitter battery packages. Adjustable internal resistor sets rate.

Uses all new components double the ratings necessary to assure long life. Housed in aluminum case, with ventilated back, and rubber feet. A deluxe design. Assembled, tested, guaranteed. No. 34K1—H-D Charger, assembled.....\$13.95

## COMMANDER R/O PULSE PACKAGES Ideal for Beginners and Sport Fliers

Get one of the Ace Commander R/O packages and you get the Commander DE Superhet Receiver, Commander Pulse Transmitter, Adams Actuator of the size you want, along with matching nickel cads, and completed wiring harness, AND you save up to \$10.00 over buying singly.

We have the packages as matched sets in three basic offerings to suit your every R/C sporting need from the smallest to the larger sized aircraft. Ready for easy installation.

The Baby Pack is for the .010 and .020 jobs although it can be used with tame .049's. Package has two GE 225 ma BHL nickel cadmium batteries and Baby Adams. With wiring harness and switch, completely assembled.

The Standard uses the LV Single Adams for more power for .049 to .07 size. Is furnished with two GE 500 ma BHL nickel cadmiums. With switch harness, assembled.

The Stomper uses the LV Twin of the Adams line for up to .15 or even .19 size jobs. Comes with two GE 600 ma cylindrical cells. With switch harness, assembled.

(Charging equipment not furnished.)

No. 10G15—Commander R/O Baby pack.....\$69.95

No. 10G16—Commander R/O Standard

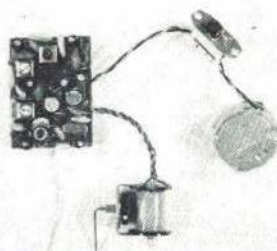
Pack ..... 71.95

No. 10G17—Commander R/O Stomper

pack ..... 74.95

(Available on 26.995, 27.045, 27.145 or 27.195 MHz. Please specify.)

## PULSE COMMANDER



### PROVEN WINNER!

### ACE VARI-CHARGER



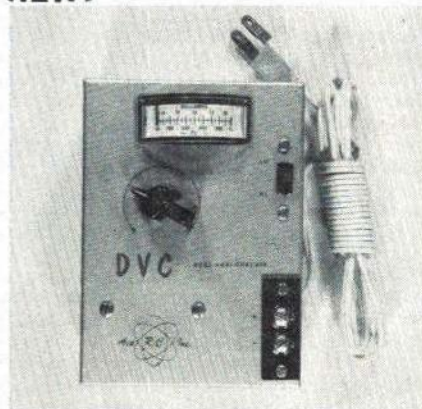
#### IN KIT FORM OR ASSEMBLED

Will charge nickel cadmium batteries—20 mils to 150 mils. Capable of charging up to 12 volt packs. Indexed dial & simple chart for correct milliamp reading for charging different size battery packs. Completely isolated from AC line supply. An extra deluxe item. New transformer of highest quality. UL approved line cord. On-off switch. 500 milliamp diode. Full instructions.

No. 34K21—Ace Vari-Charger assembled .....\$8.95

No. 34K22—Ace Vari-Charger Kit ..... 7.50

### NEW!



### DUAL VARI-CHARGER

This is the one you've asked for—A dual rate all-purpose charger! Has two ranges to cover your every nickel cad battery charging need. Completely metered in BOTH ranges so that you know how much you are putting into your batteries, and BOTH ranges are adjustable!

Heavy duty transformer for complete isolation and shock hazard protection. All components used are twice required ratings to insure long and trouble-free life.

Dual range meter has LO range of from 0 to 100 milliamperes; HI range is from 0 to 1 ampere. LO range is completely variable by external knob from 0 to 100 ma; HI is internally adjustable from 100 ma to 1 ampere for the huskiest batteries.

UL approved line cord, ventilated metal case for safe heat dissipation, HI-LO switch, edge reading US made meter, screw terminal output. Completely wired, tested and guaranteed.

No. 34K2—Dual Vari-Charger (Assembled) \$17.95

### MORE THAN JUST A CATALOG FOR 1968!

Our 1968 version of the Ace R/C Catalog is also a handbook—has an R/C Glossary; How To Solder; Pulse Proportional Control for Rudder and GG, including Decoders; Schematic Symbols; Batteries and Charging. Resistor Color Code, Transistor Chart; Electric Motor Spec Chart and many more Data Sheets you will refer to again and again. Three holes punched, 8 1/2 x 11 in size, it is designed to be added to! Will fit special Ace Binder, for permanently keeping any of your R/C instruction as well. In addition it lists all the latest Ace R/C Products and thousands of other R/C items and R/C accessories made by other manufacturers all over the world. Cost is only \$1.00. BUT this is refundable on your first order! So actually the catalog costs you nothing. Your order also places your name on the Ace mailing list to receive regular additional R/C Data info, and newsletters. The Ace Handbook-Catalog is a must for the tinkerer, the Sunday and the sport flyer. We have served the R/C field since 1953. Send your catalog buck on a round trip today. You can't lose!



\*Ace Virgin Vinyl Binder. For the protection of your Ace Catalog R/C instructions, data, news letters and much more! Only \$2.00

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Guaranteed delivery anywhere. Orders over \$5.00 sent prepaid. Orders under \$5.00 please add 50¢ for postage and packing.





## NEW PRODUCTS CHECK LIST

Write the manufacturers for more data; tell them, "I saw it in *American Aircraft Modeler*."



**Angel Mini-Flite/Blue Max Series.** Semi-scale ( $1\frac{1}{2}$ " to 1") series of WWI aircraft, these plastic, prefabricated kits (ARF's) are suitable for single channel, galloping ghost or small multi installations. Use engines from .19 to .35. First three kits released are: Fokker D-7, S. E. 5a and the Spad XIII (shown in photo). Spans are 45", wing areas-720 sq. in. Bare weights average  $2\frac{1}{2}$ -lbs. Impact-resistant fuselages are already assembled. Plastic covered tail units have full-length hinges. Dihedral braces, molded tips and full-length spars are incorporated in the factory-covered foam wings. Molded cowl and engine details add to the scale look. There also is a very complete hardware pack. Plastic used in these kits can be painted or doped, so you can add scale markings or your own color scheme. Kits are \$34.95 each. ANGEL MINI-FLITE CO., 340 Broad St., Box 437, Fitchburg, Mass. 01420.

**Associated Hobby Mfrs./Profile Publications.** Associated Hobby (AHM) has just announced that they are now the exclusive U.S. agent for Profile Publications. At last report Tank numbers one through 72 and Aircraft numbers one through 204 were in stock. New numbers are added each month. Dealers and wholesalers are urged to write for information. ASSOCIATED HOBBY MANUFACTURERS, 3200 N. Boudinot St., Philadelphia, Pa. 19134.



**Hawk Model Co./Cessna Skymaster.** Sleek, twin engine Skymaster is the most recent  $\frac{1}{4}$ " scale model from Hawk. Its sharp futuristic design with swept fins on dual tail booms makes the  $9\frac{1}{2}$ " span model appealing. Kit, at \$1, includes 50 precision

parts. All are expertly detailed. Decals add the final touch to this modern aircraft so popular for pleasure and business use.

Hawk also announced that their Grumman Bearcat is now appearing as a deluxe, custom-collector's model. The  $\frac{1}{4}$ " scale model is aluminum plated to duplicate the silver finish of full-size aircraft. All of the fine detail is there plus the armament. Just one of eight "Authenti-plate" models, its kit costs \$2. HAWK MODEL CO., 4600 N. Olcott Ave., Chicago, Ill. 60656.



**Model Covering Supplies/Poly-Fiber.** The Poly-Fiber covering process mates heat-shrinkable Dacron fabric with a tough, flexible resin called Poly-Brush. The beautiful Fleet biplane above is an example of the finish Poly-Fiber can produce. Covering process is simple. Attach Poly-Fiber to framework with Poly-Brush; don't worry about wrinkles or sags. After seams are dry, a warm iron tightens the fabric. Apply two coats of Poly-Brush (non-tightening dope). Complete by using your own choice of final finish—clear or color. Available in bulk; Poly-Fiber is \$2.95 per sq. yd. Poly-Brush is \$3.00 a qt., or \$1.60 a pint. Covering kits are also sold. They include enough fabric for an entire model and dope enough for two coats. Kit prices vary according to the size of model; request price info. Also ask for the free sample. MODEL COVERING SUPPLIES, R. R. #1, Box 142E, Loveland, Ohio 45140.

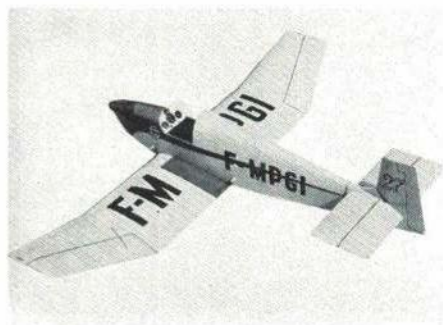
**Floquil Products/Color Chart Pack.** In this package of color charts, general information about Floquil's miniature colors and the booklet, "Painting Plastic Miniatures", the scale modeler will find a wealth of data. The booklet is a mine of useful tips and hints in applying camouflage colors. Ten charts list 114 WWII camouflage colors of the U.S.A., Great Britain, France, Russia, Italy, Germany and Japan. Also there are the current colors used in Vietnam. Regardless of the discussion, pro and con, about authenticity—these are the McCoy—Floquil produces them for the

Armed Forces. Colors on the charts are actual paint chips, and formulas are given so you may mix your own tints, using Floquil's Railroad and Military Miniature colors. Complete, the Color Chart Pack costs \$3.95 ppd. from Beaver Sales, P.O. Box 1054, Newburgh, N. Y. 12550. FLOQUIL PRODUCTS, INC., Cobleskill, N. Y. 12043.



**Testor Corp./T-34 Spotter Plane.** Testor's new control-line, ready-to-fly model is the advance spotter T-34 in authentic camouflage colors and with fine, molded-in details. Their regular Thunderbolt .049 engine drives the Nylon prop. A Rotomatic starter on the engine saves time and knuckles. Tricycle landing gear makes the ground handling easier. With fuel, battery and accessories, the T-34 is \$10.98; if you want it separately, the T-34 costs \$8.49. THE TESTOR CORP., 620 Buckbee St., Rockford, Ill. 61101.

**Power Incorporated/Nickel-Cadmium Cells.** There's a new 250 mah, cylindrical nickel-cadmium cell available from PI. It is a sintered-plate type that only weighs a  $\frac{1}{2}$  oz. Each cell, equipped with solder lugs, is 1.25" long and .56" in dia. As an added feature, there is a resealable, safety vent in each cell to keep internal pressure down in case of overcharging. Cost per cell is \$2.50. Assemble your own power pack or order a custom pack with taps at an extra charge of 25c per cell. Write for literature about the other sizes and types of rechargeable cells: POWER INCORPORATED, 12809 Eagle Ridge Dr., Burnsville, Minn. 55378.



**Midwest Products Co./Bebe Jodel.** The Bebe Jodel D-9 is reappearing, being brought back by Midwest due to popular demand and the interest in homebuilt aircraft. A favorite, light aircraft with many, the single-seat, full-size ship is powered with a Renault or VW engine. The model, with a span of  $40\frac{1}{2}$ " and an area of 296 sq. in. is suitable for .049 to .10 engines. Galloping ghost or single channel propo is ideal. Kit price is \$7.95. And the material used is that well-known Micro-Cut balsa. Write: MIDWEST PRODUCTS CO., 400 S. Indiana St., Hobart, Ind. 46342.



If you're really  
serious about  
model building,  
pick up a  
super-compact

# NEW DREMEL MOTO-TOOL



If you're after professional-looking results, a hand tool is a help, but a Dremel Moto-Tool is a must. It packs greater speed, more precision, and more fun. Especially since we have developed a whole new line of Moto-Tools that belt out enough torque to make them virtually stall-proof. This new power comes from a space-age ceramic magnet that helped our engineers design what they call a "constant-torque" permanent magnet motor. To you, this means the muscle to keep churning away at top speed, even when you're really bearing down.

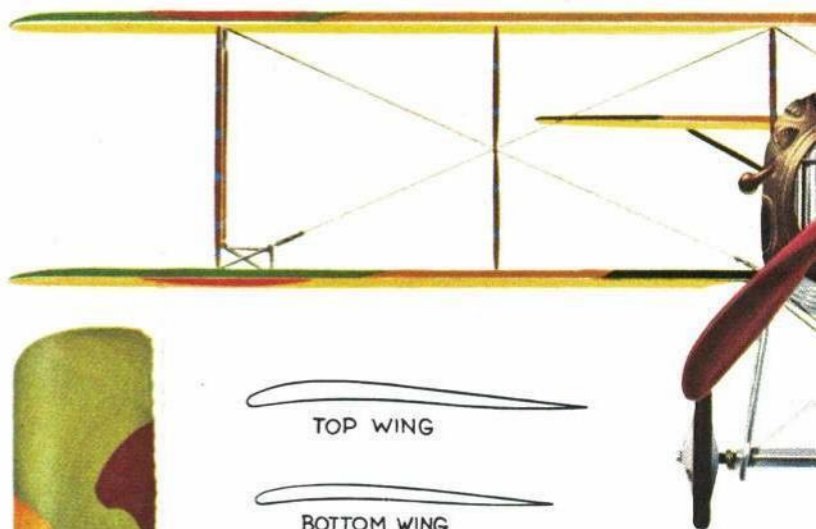
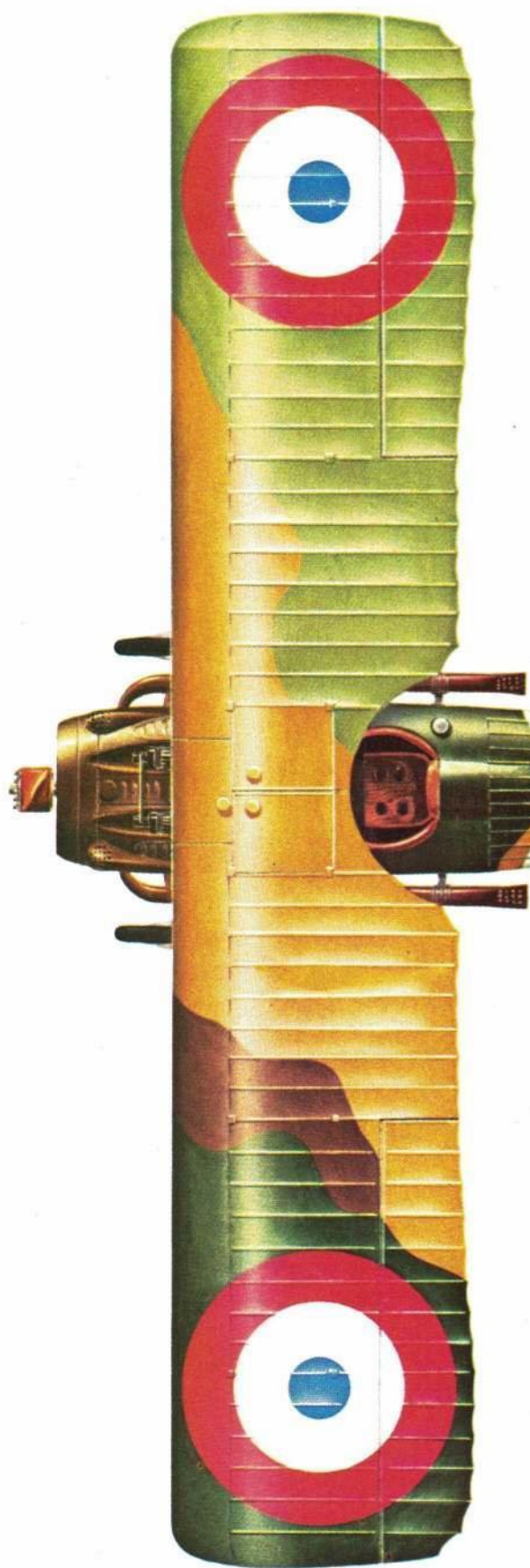
Each of our three models winds up 30,000 RPM and has a tough Lexan housing. The super-compact No. 260 weighs a scant 9 oz., while the larger No. 270 and heavy-duty ball-bearing No. 280 weigh only 11 oz. All three models are also available in kit form — the molded plastic storage case holds 34 accessories for grinding, drilling, polishing, carving, deburring, and sanding. Moto-Tool prices start at \$22.95, kits from \$32.95. So get professional — ask your hobby or hardware dealer for a "prove-it-to-me" demonstration.

Write us for your free copy of the complete Dremel Tool catalog. You'll also want to send us \$1.45 for a copy of our new 160-page Dremel Handbook of Hobbies, Crafts and Projects. It's packed with craft projects and how-to tips.



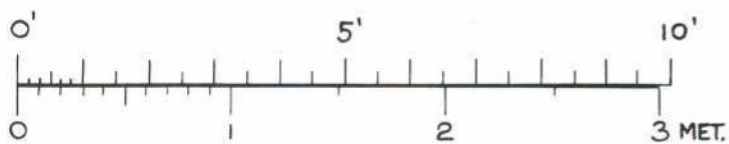
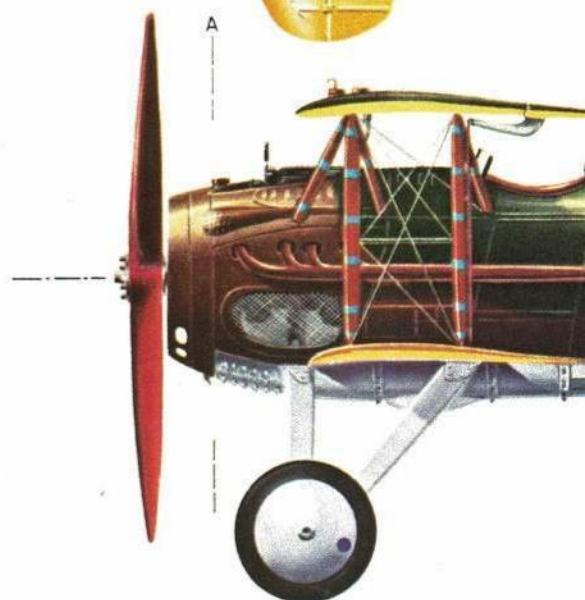
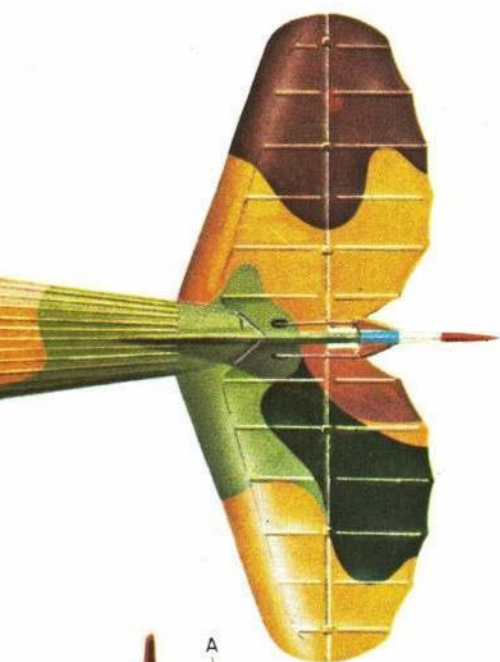
**DREMEL** Manufacturing Company, Department 688L, Racine, Wisconsin 53401



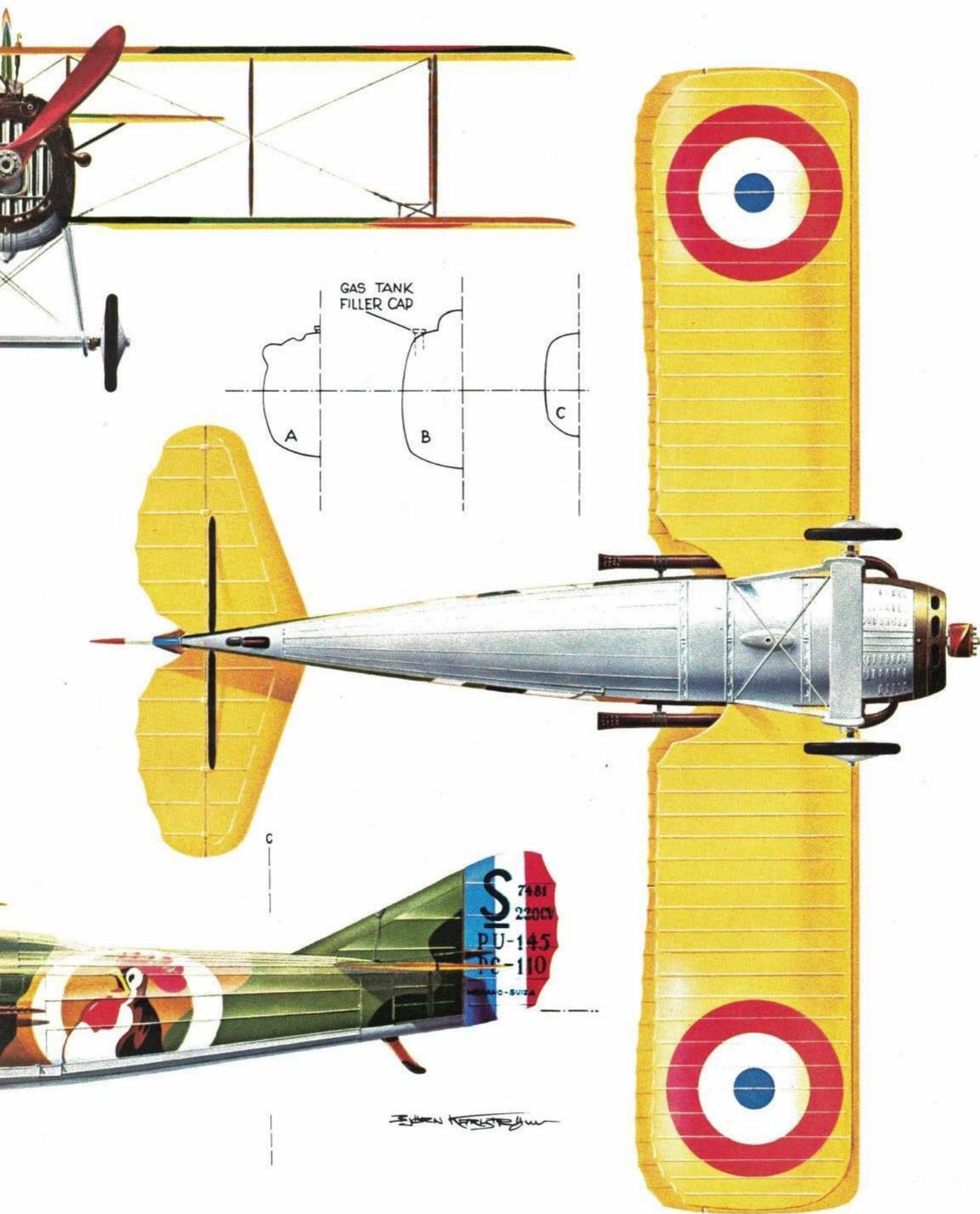


TOP WING

BOTTOM WING







American Aircraft Modeler album of all-time favorites:

## SPAD XIII C.1

S XIII, Escardille SPA 48, flown in France in February 1918. Power-plant was a Hispano-Suiza 8BA (1917) or Hispano-Suiza 8BEc (1918).



The First and Only Airplane Model With the Actual Sound of the Big Jets

# B-52

STRATOFORTRESS

Electric Powered  
**Jet Engine  
Sound\***

## You Hear It— as You See It!

**Big 30 Inch Wing Span  
Working Features**

**Model  
of the  
Year!**

This is the fabulous 200-ton, 185-foot wing span Boeing B-52. It's the biggest and finest 1/72 scale model ever and with realistic jet engine sound\*. Amazingly detailed. Many working features. Wing span 30-7/8 inches. 26 inches long. 8 inches high.

Kit includes electrically powered sound device (patent pending) that produces a whine just like the big jets, plus electric motor and on and off switch.

Bomb bay doors operate. Four-gun rear turret swivels up and down and side to side. Wing flaps slide in and out. Wing spoilers move up and down. Detailed cockpit with flight deck, seats, consoles, control columns and three crew members. Bombs, guns, tanks. Instruction booklet and authentic decals.

\*Patent  
Pending

See This Magnificent B-52 Model at Your Favorite Store

## Win an Air Trip to U. S. Air Force Academy or One of 1340 Other Prizes in B-52 Sweepstakes

Ask your hobby dealer about the B-52 Sweepstakes. Prizes include all-expense paid air trip for two to Colorado Springs and the Air Force Academy, Home Shop Sets, Air Brushes, Paint Sets, Xacto Knife Sets and Hobby Kits—1341 prizes in all.

Open to everyone except Monogram employees and agents and residents of areas where prohibited by law. Just see your hobby dealer. Get a B-52 kit and send in your name and address on the official entry blank in the kit box, plus the

Monogram trade mark from the box end, or write your name and address on a plain piece of paper 3½ x 6 inches and send it with a rough sketch of the trade mark. Address: Sweepstakes, Monogram Models, Inc., Morton Grove, Illinois 60053.



# Getting Started in R/C

There are many sources of external interference.

A monitor is highly recommended!

## HOWARD McENTEE

THIS month we'll cover several forms of interference which can bother R/C receivers. Part 12 of this series (Aug. '68 issue) described various causes of interference that could be *inside* your plane, but this month we'll take up those that are external. Whenever an R/Cer has a malfunction, be it just a fleeting one or one that persists, the first thought is "interference." Our observation has been that in most cases the "interference" is right in the flyer's own equipment! But outside signals can cause trouble, of course. So let's look into the matter.

Another transmitter on your own flying field can be the problem. Perhaps, another flyer turned on his transmitter—on your frequency—just briefly to move his engine throttle. Perhaps a toddler turned on his Pappy's transmitter while playing. Perhaps another modeler forgot to turn off his transmitter after he landed his plane. All these possibilities—and there are still others—point to the necessity of placing all transmitters in an "impound" area, even at fun-flying sessions.

Transmitters may be in operation at a nearby spot, unknown to you. They may be in use by plane, boat or model-car operators. CB phone operators sometimes fit their equipment with crystals for the R/C spots. They justify this (it's strictly illegal) on the grounds that there is lots less interference on our spots than on theirs.

A monitor is a fine way to check for such signals; you can make one or buy a commercial unit on 27 MHz, but we know of none to be had on 50 or 72 MHz. A monitor only can catch signals at ground level, however. Sometimes a plane will behave nicely up to a hundred feet or so, but above that it will go ape. Monitors will often

detect a weak signal on the ground, which is strong enough higher up (when the model is much farther from your own transmitter, and hence getting a weaker signal from it) to disturb your plane. Therefore, they are very worthwhile equipment. Probably every individual flyer wouldn't want to purchase one—but a club might do so.

Lacking a monitor, you can turn on your plane equipment and watch the controls. If you have a super-regen receiver this might not tell you much, for some regens will cause violent control movements with no income sigs (or any interference from inside the model either). Superhets can generally be checked this way, though. Needless to say, if the controls are perfectly quiet for some minutes, then start to move at random, possibly going dead again after a few moments, you'd have good reason to suspect an incoming signal on your frequency.

Strong signals from nearby transmitters can cause an effect called "swamping," even though they might not be on your spot frequency. They are simply overloading the receiver input, so that your own transmitter can't get through to it. This is most apt to happen with super-regen receivers, of course, since generally they are relatively very broad in tuning.

A form of interference which can disable your receiver is due to what are called "images." These are bothersome only with superhet receivers and can be completely eliminated by proper design. But R/C manufacturers evidently feel the modeler will not pay a bit extra for insurance against this problem (which could also make your receiver a bit larger and heavier). All superhets can pick up either of two signals—that to which the set is tuned and which is the desired signal, or another differing from this one by about 910 KHz.

The latter is the "image," and in R/C receivers it is generally 910 KHz lower than the frequency upon which you are operating. The better the input (also termed front-end) selectivity of the receiver, the less trouble you will have with images.

On the 27 MHz band, all image interference comes from signals outside the Citizens Band (generally from about 26.080 to 26.350 MHz). You can't check this unless you have a monitor (which is simply a tunable receiver) which covers this range. On the 50 MHz band, other R/Cers can cause the trouble, even though their equipment is absolutely blameless. It was for this reason that the AMA has set up recommended R/C frequencies on 50. These were chosen to avoid as much as possible the amateur communication operators in the band, images from other R/C equipment, and harmonics from 27 MHz. The spot frequencies for 27 and 72 MHz are pretty well known, since they have been made mandatory by the FCC. Similarly, the matching transmitter frequency flags or ribbons are well known by most R/Cers.

This is not true of the suggested R/C spots on the 50 MHz band, however. They are as follows: Superhets should use 53.1 MHz (black and brown ribbons); 53.2 (black and red); 53.3 (black and orange); 53.4 (black and yellow); 53.5 (black and green). Two spots have been designated solely for super-regens: 51.20 MHz (black and light blue); 52.04 (black and violet). If these seven spots are used exclusively, we'll have lots less interference trouble on the 50 MHz band! Most R/C manufacturers can supply the necessary crystals and some, we're glad to note, supply *only* crystals for these spots.

You might not think sunspots have anything to do with R/C—but you couldn't be more mistaken! The sunspot "cycle" varies periodically about every 11 years—and we are now almost to the point of maximum in the cycle. Many sunspots mean great disturbance of the upper atmosphere—and that means the likelihood of very strong signals reaching your area from thousands of miles away, and possibly from very low-powered transmitters. This effect is the worst (as far as R/C goes) on the 27 MHz band, still troublesome on 50 MHz, and very unlikely to cause trouble on 72 (a good reason to pick the latter band when you

*Continued on page 73*

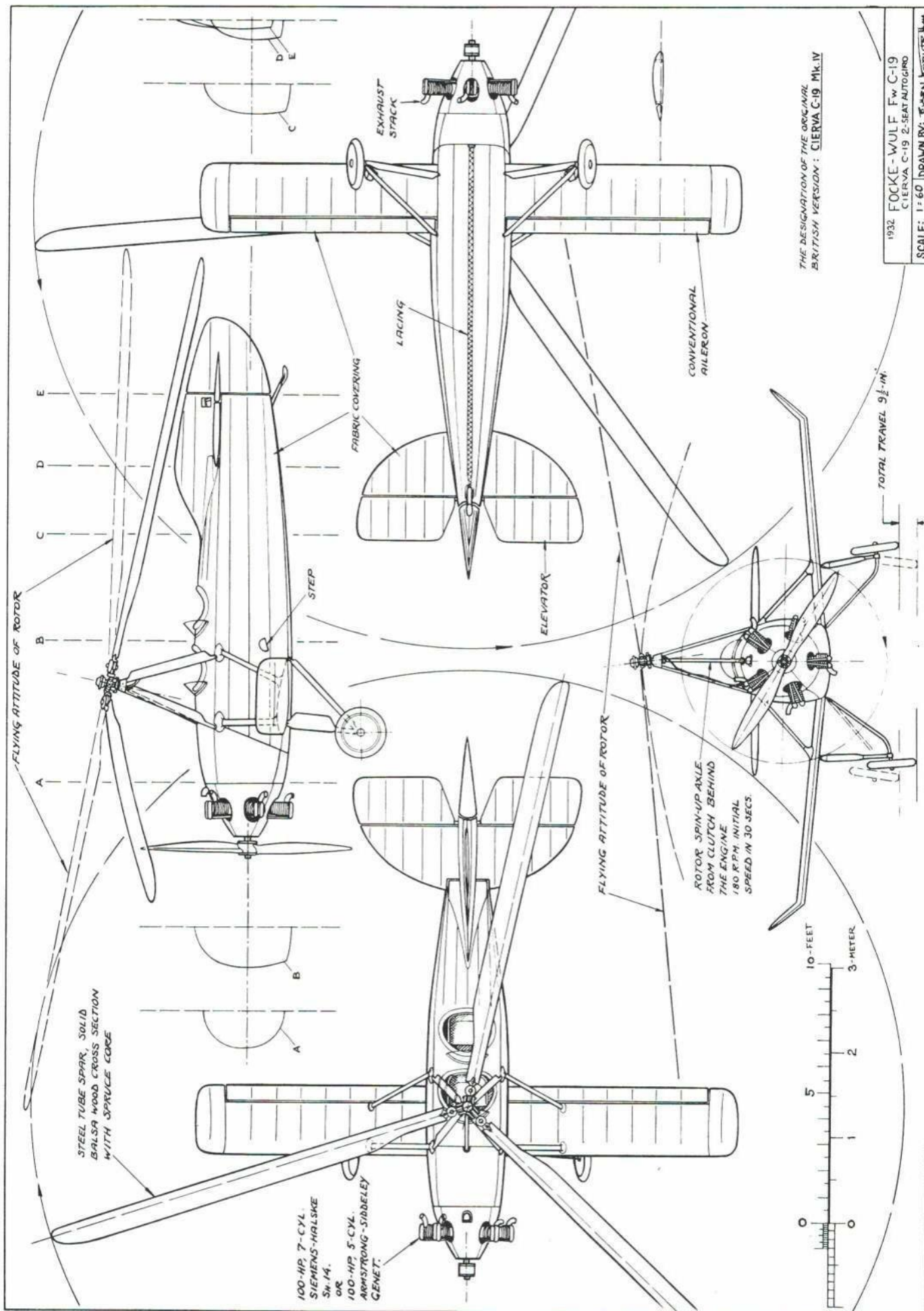


The interference monitoring equipment used at the 1968 DCRC Symposium was a pair of Hewlett-Packard Spectrum Analyzers which observed the frequencies as each person flew. Similar equipment was used at the recent Nationals where a spectrum analyzer checked and monitored the 72-Mhz equipment, while several Collins Radio receivers were used to monitor each of the 27-Mhz frequencies, and one receiver was tuned to monitor 50-Mhz flyers. Protection resulted in no interference-caused crashes at the Nationals.



A contestant at a recent Nationals undergoes the radio equipment processing procedures. Collins Radio Corp. supplied the test system which examines the quality, sharpness, and no-side-band emissions of the signals from every transmitter.









# model aviation

Official magazine of the Academy of Model Aeronautics • 1239 Vermont Avenue N.W., Washington, DC 20005

INTERESTED IN JOINING A.M.A.? Over 25,000 did in 1968. Membership details may be had by requesting FREE BROCHURE from above address.

## Another Big Nats, with Emphasis on Youth

Almost twice as many youngsters flew in the 1968 National Model Airplane Championships, as compared with 1967 — without counting many hundreds more who took part in a special kids-only "delta dart" competition. Out of over a thousand entered in the regular Nats events almost four hundred were under 21, a 36% increase over last year. In addition, over 700 kids under 16 flew so-called delta darts (actually AMA Cub kits, produced by Sig Mfg. Co.) in the special contest which saw most participants build and fly their first model airplane.

The competition in all events was fierce and the performance of youngsters overshadowed that of many adults — even in radio control. In many events the winning Junior performance was better than that of Open contestants. This was true in A Gas and Unlimited Rubber free flight events, and in control line Rat Race. Also, in control line 1/2A Proto the first four Juniors scored higher than all the Seniors and all adults except the first place Open winner. And in RC Pylon Racing a Junior was among the 20 finalists while several Juniors and Seniors outplaced a majority of the pattern event contestants.

The ratio of youngsters to oldsters was improved, without limiting adult involvement, by simply increasing the number of Juniors and Seniors. The official registration had one less adult than in '67, so that of the 169 total increase in registration over last year all were youngsters. The dramatic change in age direction was noted by Navy officers who indicated that a continuance of youth emphasis would assure future Navy support.

The 1968 Nats was a tremendously busy affair. Even with twelve-hour competition days there wasn't time to get all the flying done in some events. But flying from seven am to seven pm wore everybody out, especially officials — they still had to tabulate results after events ended. And RC Pattern flyers never did really adjust to getting up at five am every morning — it was a long haul from the motels.

The long hours made it rough on extra-curricular activities, too. The usual evening AMA meetings (Contest Boards, Council, etc.) got started late, as did various banquets and bull sessions. Unofficial flying events barely got squeezed in, and night time model processing was a chore. The contestant hangar stayed busy. Many said it was like the Nats of old, with more models and activity than usual filling up the acres of workbenches.

Hundreds of latecomers jammed the final hours of registration, adding a tremendous amount of paperwork to be processed into the late hours. Event entry predictions took a beating as did trophy distribution. Because of the need to order trophies well

before the Nats, distribution had to be based on advance (mail) entry. In many events where less than a dozen advance entries were registered, the final entry lists doubled or tripled. Where last year many trophies could be reassigned from low to high entry events, there were few events which did not award all trophies available. The standings, therefore, do not necessarily indicate trophies awarded to those listed — most events provided five trophies, some only three or four.

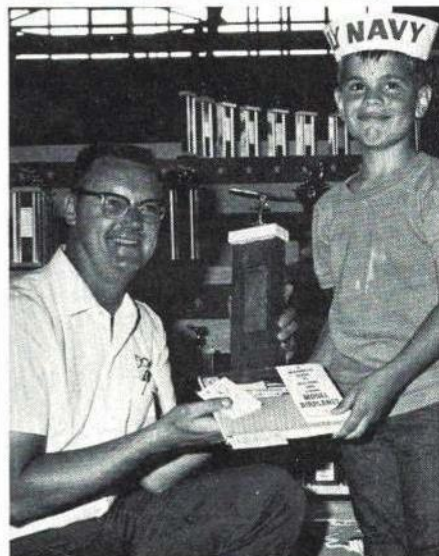
More AMA manpower than ever before was utilized to run this Nationals. Almost 150 officials were involved as AMA this year took on a number of jobs previously handled by Navy personnel. Indoor events, for example, were run without Navy people (though the Navy did obtain use of the building in Kansas City and cover the

*Continued on page 52*



U. S. Navy Photo

Mike Taibi, 13, son of renowned free-flighter Sal, won 1968 Junior National Championship.



U. S. Navy Photo

Upper shot shows awards presentation for the kids-only AMA Cub competition staged as a special program during the Nationals. More than 700 youngsters took part. At lower right Ken Wilson is presenting first place Cub event trophy to Mike Blake, 9, of Olathe. Wilson spearheaded local KC area efforts in popularizing the Nats Cub model program.



# RESULTS AND HIGHLIGHTS 1968 NATIONALS

## NATIONAL CHAMPIONS

### Junior

Mike Taibi, Lakewood, Calif.

### Senior

Dan Wakerley, Napa, Calif.

### Open

Glenn Lee, Batavia, Ill.

### Grand

Glenn Lee, Batavia, Ill.

## PERPETUAL TROPHIES

**Tulsa Glue Dobbers** (High time regardless of age, Nordic A-2 Glider): Catherine Monts, Wichita, Kans.

**Mulvihill** (High time regardless of age, Unlimited Rubber): Gary Heeb, Xenia, Ohio.

**Tulsa Glue Dobbers** (High time regardless of age, Outdoor Hand Launch Glider): Robert Larsh, Indianapolis, Ind.

**Top Flite** (First place, Senior 1/2A Gas): Michael Ettel, Florissant, Mo.

**Hoffman Memorial** (High time regardless of age, A Gas): Joe Raines, Anaheim, Calif.

**Testor's** (Best model finish, regardless of age): V. Andrew Sheber, Livonia, Mich.

**Jim Walker** (Winner of Junior-Senior-Open flyoff, Control Line Stunt): Robert Gieske, Irving, Tex.

**Stout Indoor** (High time regardless of age, Indoor Cabin): Bucky Servaites, Dayton, Ohio.

**Stout Commercial** (High time, regardless of age, Indoor Stick): James Richmond, Bensonville, Ill.

## NATIONAL CLUB AWARD

### Club Team Champions

Oakland Cloud Dusters: E. Thompson, M. Thompson, M. Andrade, P. Andrade, G. Geraghty.

## NATIONAL TEAM AWARD

### National Team Champions

U. S. Air Force Team: H. Hawkins, R. Adair, L. Miller, G. Brown, K. Oliver.

## SPORTSMANSHIP AWARDS

George Aldrich, Ed Izzo, Steve Wright.

## 1968 NATS SPONSORS

Approximately 500 awards were provided through the contributions of the following:

Ace R/C, Inc.  
Adel Division, De Laval Turbine  
Ambroid Company, Inc.  
American Aircraft Modeler  
Andrews Aircraft Model Co., Inc.  
Aristo-Craft Distinctive Miniatures  
Burgess Battery Company  
Calbody Steel Forming  
Carl Goldberg Models, Inc.  
Chamblee Products  
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Comet Model Hobbycraft Corp.  
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Midwest Products Company  
MRC-Enya Company, Inc.  
Orbit Electronics, Inc.  
Pactra Chemical Co., Inc.  
Performance Aero Products, Inc.  
Pettit-Hobbypoxy  
Progress Engineering Co.  
Rand Mfg./Take-Off Products  
RC Modeler Magazine  
Romak Steel Company  
Rotary Pen Corporation  
Russell, Marsh & Kennedy, Inc.  
Scientific Models, Inc.  
Sig Manufacturing Company  
Sterling Models  
Sullivan Products  
Tatone Products  
The Testor Corporation  
Top Flite Models, Inc.  
Western Model Distributors  
Williams Brothers  
World Wide Radio Control

## 1968 NATS

Contest Director — Ron Morgan  
Contest Manager — Earl Witt

Nats Staff: John Clemens, Bob Lutker, Ina Lopshire — Public Relations; Cliff Piper — Tabulation Chief; Bruce Sparrow, R. Yarrows, R. Barkowski, Ruth Meyer — Tabulation Assts.; Bill Bowen — Processing; Max Ripken, Tom Sutor, John Thornhill, Patty Thornhill — Awards; Russ Sellars — Supplies; Dick Meyer, Ralph Pennetti, Eva Biddle, Bob Lopshire, Ken Wilson, Carl Perkins, George Anderson — Junior Programs.

HQ Staff: John Worth — Executive Director; Frank Ehling — Technical Director; George Wells — Public Relations; Jocelyn Cardinale, Jim Stoneback, Lesley McGill & Roy Relp — Registration and Admin. Assts.; L. Weir, G. Weir, J. Clawson, R. Biddle & J. Harris — Hobby Shop.

## 1968 NATS ENTRIES

	Jr.	Sr.	Open	Total
No. of Advance Entries	190	90	550	830
No. of Late Entries	57	41	109	207
Total Entries	247	131	659	1037
Total Mechanic Entries				360



Combined 1/2A Speed and 1/2A Proto Speed pit area was beehive of activity. Junior Proto winner topped all Seniors, most Opens. All Cox engines.

## CONTROL LINE:

DIRECTOR: Pete Peters

Speed Director: Murry Frank

Assistant: Johnny Smith

### 1/2A SPEED

Junior	mph
1. Brian Pardue	93.42
2. Gary McGraw	89.07
3. Danny Bartley	88.20
4. Kenneth Scott	85.68
5. Michael Taibi	85.68

### Senior

1. Barrie Hobkirk	93.71
2. Dan Wakerley	90.87
3. George Brown III	86.50
4. Gerald Myres	83.30

### Open

1. Charles Legg	119.32
2. Warren Kurth	106.09
3. Anaston & Morton	103.17
4. Bucky Servaites	91.80
5. Nash & Pardue	87.34

### A SPEED

Junior	mph
1. Bill Nelson	137.35
2. Bruce VanHoozen	133.28
3. Michael Hainen	126.71
4. Gary McGraw	125.82
5. Brian Pardue	123.24

### Senior

1. Gerald Myres	148.70
-----------------	--------

2. Dan Wakerley	140.57
3. Joe McKinzie	134.27
4. George Brown	134.27
5. Robert Heywood	130.38

### Open

1. Baltes & Beatty	157.83
2. Luther Roy	157.83
3. Harris & Shelton	152.48
4. Burrus, Aldrich & Wheeler	148.70
5. Robert Heminway	147.48

### B SPEED

Junior	mph
1. Gary McGraw	156.46
2. Bruce VanHoozen	141.68
3. Michael Hainen	138.41
4. Terry Herron	130.38
5. David Herbert	118.37

### Senior

1. Joe McKinzie	165.07
2. John Deaton	165.07
3. Gerald Myres	162.10
4. Dan Wakerley	150.57
5. Robert Mohr	148.70

### Open

1. Graham, Bocher & Davis	171.36
2. Anaston & Morton	169.74
3. Glenn Lee	168.16
4. Harris & Shelton	167.37
5. Nightingale & Newton	165.07

### C SPEED

Junior	mph
1. Mike Marsh	138.41
2. Gary McGraw	137.35



3. Fred Anderson	137.35
4. Bob Wright	120.76
5. Chuck Bankemper	113.88

#### Senior

1. Joe McKinzie	176.40
2. George Brown	169.75
3. Larry Newman	168.63
4. Robert Heywood	165.07
5. Dan Wakerley	156.46

#### Open

1. Anaston & Morton	183.04
2. Vassallo & Telford	181.75
3. Burrus, Aldrich & Wheeler	180.65
4. Graham, Booher & Davis	179.93
5. Fridley & McGraw	178.15

### JET SPEED

#### Junior-Senior mph

1. Danny Bartley	150.32
2. George Brown III	149.94

#### Open

1. Mike Olson	175.54
2. Charles Serie	173.01
3. Harry Latshaw	171.36
4. C. R. Sackett	169.74
5. Glen Payne	166.68

### FAI SPEED

#### Junior km/hr

1. Harold Nash	177.78
2. Brian Pardue	169.01

#### Open

1. Nightingale & Newton	228.57
2. Glenn Lee	225.70

### 1/2A PROTO SPEED

#### Junior mph

1. Terry Herron	84.87
2. Bruce VanHoozen	83.96
3. Gary McGraw	81.42
4. Danny Bartley	80.69
5. Guy Rogers	76.57

#### Senior

1. George Brown	73.44
2. Harry Nixon	73.44
3. Dan Wakerley	72.85
4. Joe McKinzie	68.94

#### Open

1. Warren Kurth	92.94
2. Ronald Esman	78.57
3. Bucky Servaites	78.57
4. Bill Kirn	76.89
5. Bob Adair	76.89

### B PROTO SPEED

#### Junior mph

1. Terry Herron	121.57
2. Bill Nelson	111.90
3. Kenneth Scott	109.05
4. Michael Hainen	104.98
5. Richard Sherman	102.06

#### Senior

1. Joe McKinzie	136.05
2. Dan Wakerley	128.98
3. John Deaton	125.08
4. Les Baer	99.41

#### Open

1. Glenn Lee	148.33
2. Howard Weaver	136.00
3. Harris & Shelton	135.49
4. Robert Heminway	132.79
5. William Garner	132.64

### AEROBATICS (STUNT)

Event Director: Bud Tenny

Assts.: H. Mottin, G. Aldrich

#### Junior points

1. Tommy Morgan	396
2. Dennis Adamisin	384
3. Mike Gearhart	363
4. James Smith	340
5. Tom Hartvigsen	337

#### Senior

1. Robert Howard	427
2. Norm Whittle	406
3. Phillip Granderson	399
4. Sidney Rowe	387
5. Harold Theriot	383

#### Open

1. Robert Gieske	477
2. Walter Kostecky	469
3. Jerry Worth	460
4. Lew McFarland	459
5. Keith Trostle	56

### STUNT — SP'L. JR.

#### Flight Points Only

1. Wayne Colgan	341
2. Jamie Jones	230
3. David Salguero	82
4. Brian Pardue	24
5. Bob Faris	22



Fine Jr. Rat Race form. Tim Zimmer (tallest) won. Others are Jeff McPherson, Tommy Morgan.



U. S. Navy photo

Senior Champ Dan Wakerley gained many points in speed. Dad, Bob, releases model as Luther Roy clears away gear.

### COMBAT

Event Director: Dick Marek

Asst.: Ray Gallaway

#### Junior

1. Tommy Morgan
2. Robert Myres
3. Bret Porter
4. Brett Hudson
5. Mark Anschutz

#### Senior

1. Roger Courey
2. John Gladfelter
3. John Welte
4. Chuck Schroll
5. Steve Mills

#### Open

1. Riley Wooten
2. Pierre Sigouin
3. Robert Oder
4. Steve Ragsdale
5. Terrence Durrill

### FAI TEAM RACE

Event Director: Gosta Johnson

Asst.: Duane Bender

#### Junior-Senior-Open

No contest.

### RAT RACE

Event Director: Gosta Johnson

Asst.: Duane Bender

#### Junior

1. Tim Zimmer	5:41.2
2. Craig Bankemper	6:03.0
3. Danny Bartley	6:03.7
4. Mark Anschutz	6:14.1
5. Michael Hainen	6:30.1

#### Senior

1. Gregory Riede	6:12.0
2. David Adamisin	6:16.8
3. Larry Newman	6:26.7
4. Jerry Haupt	6:26.9
5. Dennis Watson	6:48.1

#### Open

1. Howard Weaver	5:47.9
2. Howard Mottin	5:51.9
3. Carl Morgan	6:08.4
4. Daniel Jones	6:12.5
5. Thomas Southern	6:25.6

### NAVY CARRIER

Event Director: Ray Gallaway

Assts.: D. Marek, D. Bender

#### Class I

#### Junior Points

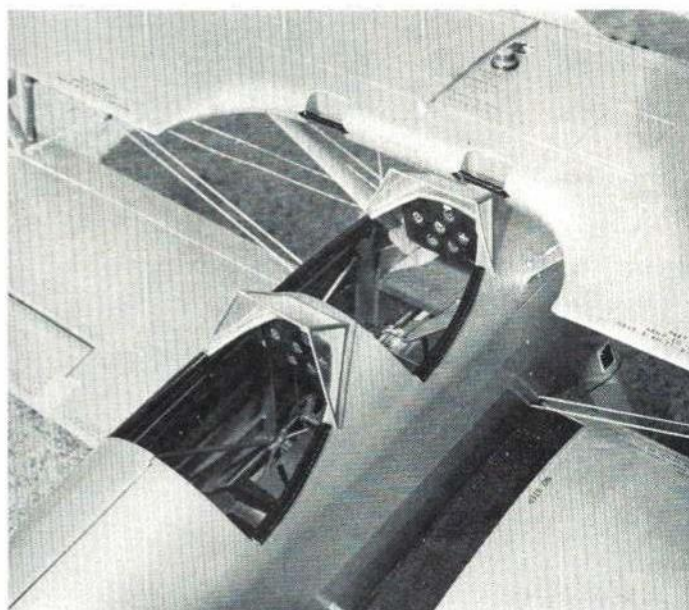
1. John Gerber	353.81
2. Douglas Tomayko	351.03
3. Deborah Hannon	332.12
4. Joe Tolins	303.55
5. Robert Sawicki	296.54

#### Senior

1. Edwin Gross, Jr.	412.04
2. Robert Woodcock	408.00
3. Robert Heywood	319.44
4. John Deaton	313.24
5. Mike Richardson	220.25

#### Open

1. Howard Mottin	552.04
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Stearman PT 13 D/N2 S5 took 2nd place Open CL Scale for Ernest Violett, College, Pk., Md. Surfaces operable from 2nd cockpit controls. K&B 45.



Many top speed places again taken by Harris-Shelton team, Baton Rouge, La. Cl. A original shown. Super Tigre 15 rear rotor, crankcase pressure tank.



2. Marion Sawicki	521.28
3. Charles Banks	513.09
4. Richard Sawicki	487.43
5. Charles Reeves	485.80

#### Class II

Junior	Points
1. Douglas Tomayko	422.73
2. Kenneth Elder	414.09
3. Deborah Hannon	220.97

#### Senior

1. Edwin Gross, Jr.	526.24
2. Robert Heywood	433.67
3. Danny Johnson	309.30

#### Open

1. E. Ray Willman	552.64
2. Richard Sawicki	539.93
3. Charles Banks	538.87
4. E. R. Peterson, Jr.	502.87
5. Marion Sawicki	483.16

#### NAVY CARRIER SP'L. AWARDS

Class I Profile	Points
Best Jr. — Robert Sawicki	296.54
Best Sr. — Robert Heywood	319.44

#### FLYING SCALE

Event Director: Johnny Casburn

Junior	Points
1. David Salguero	391
2. James Phillips	291
3. Larry Wertsch	233
4. Russell Kühlen	230

#### Senior

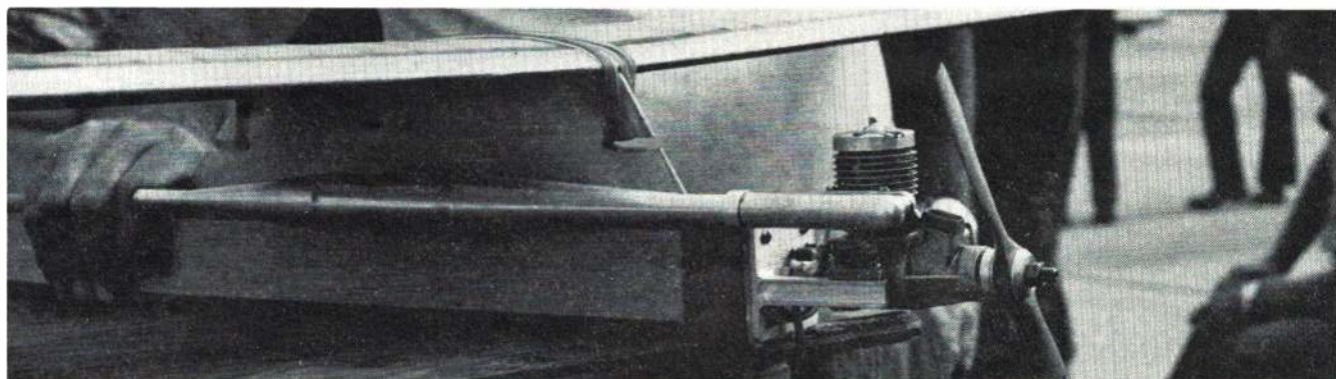
1. Dale Hungerford	342
2. Richard Loomis	288
3. Michael Stott	271
4. John Blaisdell	240

#### Open

1. Linton Keith	548
2. Ernest Violet	474
3. Frank Beatty	459
4. Jerry Worth	455
5. Robert Klinfelder	452



Fine looking stunt models of Bill Werwage, Berea, O., and Jerry Worth, Harvey, Ill. Own design Super Aires by Werwage powered by K&B 35, and Apterix design by Worth, Super Tigre 40 G21. Worth came in third.



Mike Poorman's (Baltimore) FAI Power model was loaded with goodies. Tuned pipe, Super Tigre G15, timer actuated rudder and stabilizer.



Two original FAI Power models by Hardy Broderson, Birmingham, Mich. Note elliptical dihedral in model at right, sheeted wings. Different.



A-2 FAI glider of Jim Wumer, Toledo, O., being held for tow by co-designer Roland Anderson. Bob Sifleet steadies the wing in the wind.



# FREE FLIGHT — Outdoor

Director: Pete Sotich

## 1/2A GAS

Event Director: Ed Fronczek

Junior	Time
1. Kevin Romak	14:04
2. Fred Anderson	12:58
3. Mark Kerr	12:21
4. Michael Taibi	12:06
5. Paul Andrade	11:57
Senior	Time
1. Michael Ettel	14:41
2. Kurt Smitz	10:16
3. Brian Violet	9:54
4. John Blaisdell	9:22

5. Jerry Rupe	9:07
Open	Time
1. Victor Cunningham	19:12
2. Clayton Hornbeck	17:03
3. William Haught	15:00
4. James Scarborough	14:56
5. John Pfeifer	14:36

## A GAS

Event Director: Ed Fronczek

Junior	Time
1. Joe Raines	20:59
2. James Haught	14:05
3. Marty Thompson	13:06
4. Paul Andrade	11:55
5. Kevin Romak	11:20
Senior	Time
1. Mike Richardson	12:23
2. Brent Meyers	11:38

3. Gary Myers	11:08
4. Richard Boyd	9:25
5. Thomas Rodgers	9:17
Open	Time
1. Ken Oliver	15:00
2. Thomas Peadar	14:49
3. J. R. Mason, Sr.	14:43
4. Howard Heckendorf	14:37
5. John Pfeifer	14:30
5. Walter West	14:30

## B GAS

Event Director: M. DesJardins

Junior	Time
1. Brian Webster	12:32
2. Robert Hallum	11:47
3. Mark Kerr	11:38
4. Michael Taibi	11:08
5. Terry Herron	10:42
Senior	Time
1. Arthur Markiewicz	11:15
2. Larry Newman	10:19
3. Mike Richardson	10:12
4. Michael Ettel	10:10
5. Susan Weisenbach	8:52

## C GAS

Event Director: Ed Fronczek

Junior	Time
1. Edmund Bellinger, Jr.	15:00
2. John Pfeifer	14:54
3. William Mette, Jr.	14:38
4. James Clem	13:45
5. Rolland Anderson	13:41
Open	Time
1. Edmund Bellinger, Jr.	15:00
2. John Pfeifer	14:54
3. William Mette, Jr.	14:38
4. James Clem	13:45
5. Rolland Anderson	13:41

## FAI POWER

Event Director: Floyd Miller

Junior	Time
1. Marty Thompson	13:18
2. Michael Taibi	12:25
3. Raymond Faulkner	12:23
4. William Burgess, Jr.	11:18
5. Terry Herron	10:31
Senior	Time
1. Larry Newman	10:02
2. Michael Ettel	8:04
3. William Vanderbeek	7:29
4. Arthur Markiewicz	5:57
5. Susan Weisenbach	2:30

## WAKEFIELD RUBBER

Event Director: Floyd Miller

Junior	Time
1. Denny Dock	12:53
2. Steven Valerius	12:45
3. James Haught	12:35
4. William Schlarb, Jr.	11:30
5. John Mathews	9:24
Senior	Time
1. Gary Neighbors	17:08
2. David Blubaugh	13:57
3. Michael Ettel	12:27
Open	Time
1. James Wumer	19:34
2. Rolland Anderson	19:17
3. Robert Sifleet	18:47
4. James Kutkuhn	18:32
5. Robert Dunham	17:48

## UNLIMITED RUBBER

Event Director: Floyd Miller

Junior	Time
1. Gary Heeb	13:41
2. Eric Johnson	13:22
3. Robert Dunham II	11:03
4. Robert Hays	10:38
5. Michael Bailey	7:38
Senior	Time
1. Jan Servaites	17:42
2. Catherine Monts	14:15
3. William Vanderbeek	12:21
4. Richard Dolby	11:14
5. Gary Myers	1:41
Open	Time
1. Rolland Anderson	18:40
2. Francis Heeb	18:07
3. Philip Klintworth	17:58
4. Jack McGillivray	17:53
5. Michael Valerius	17:26

## FLYING SCALE

Event Director: V. Cunningham, Sr.

Junior	Time
1. Bruce VanHoozen	3:09
2. John Nix	2:53
3. Jeffrey Nix	2:48
4. Marty Thompson	2:42
5. William Gibbs	2:26
Senior	Time
1. Christopher Taft	3:11
2. Dan Wakerley	2:44
3. Mike Ettel	2:33
4. Arthur Markiewicz	2:13
5. Daniel Rodgers	1:56
Open	Time
1. Robert Larsh	5:42
2. Meredith Chamberlain	4:56
3. Richard Mathis	4:50
4. Anthony Vaughan	4:20
5. Joseph Ziomek	4:00

## ROCKET POWER

Event Director: Pete Sotich

Junior	Time
1. Mike Taft	5:23
2. Gary Plone	4:34
3. Bruce Hannah	3:05
4. Brian Pardue	2:46
5. Charanne Moore	2:36
Senior	Time
1. Michael Ettel	5:02
2. William Vanderbeek	4:02
3. Jan Servaites	2:48
4. Thomas Mills	1:45
5. Christopher Taft	1:19
Open	Time
1. Lee Polansky	10:20
2. Robert Kleinfelder	9:15
3. James Jensen	7:27
4. Charles Sotich	6:34
5. James Kutkuhn	5:27

## NORDIC GLIDER

Event Director: Floyd Miller

Junior	Time
A-1	
1. Paul Andrade	9:21
2. Steven Valerius	8:31
3. John Welch, Jr.	7:23
4. Paul Tobie	7:03
5. Joe Raines	6:33
A-2	
1. Robert Tweed	13:41
2. Michael Taibi	13:13
3. Mark Kerr	13:01
4. Brian Webster	12:14
5. Terry Herron	10:36
Senior	Time
1. Catherine Monts	17:46
2. Kurt Smitz	13:26
3. Gary Myers	13:02
4. Michael Ettel	12:08
5. Daniel Rodgers	10:21
Open	Time
1. Donald Reed	16:10
2. Willard Smitz	15:07
3. Robert Hanford	14:40
4. Robert Plone	14:14
5. George Perryman	13:55

## HELICOPTER

Event Director: Lee Polansky

Junior-Senior-Open	Points
1. Glenn Lee	150.9
2. D. Lee Taylor	133.1
3. William Ellerman	120.5
4. John Burkam	45.5
5. C. O. Wright	44.9

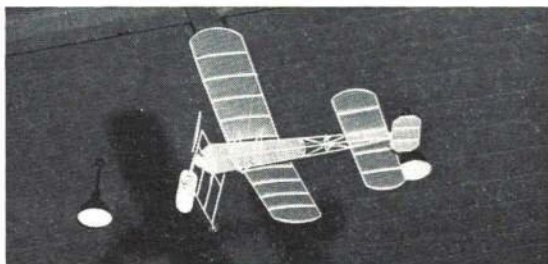


C Gas event, in progress here, was directed by Ed Fronczek, handing flight card to Navy recorder. B Gas director Mike desJardins in back, holds hat.



James E. McNeill, Birmingham, Ala., prepares to wind his 4-bladed-prop original Wakefield, used 1/4 sq. rubber. Daughters Lucy and Sally help.





Indoor Scale Bleriot by Roger Schroeder, Overland Pk., Kans., was flown in NFFS unofficial event. Used Sig 'plans.



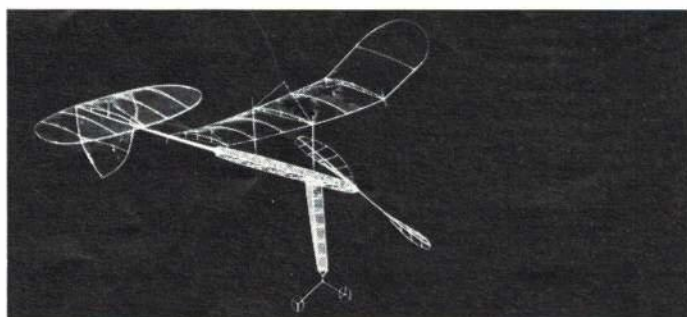
U. S. Navy photo

The Taft family from Salt Lake City all entered Indoor Glider. Barney, father; Kit, 17; Mike, 12; Cory 8. Competitors all.

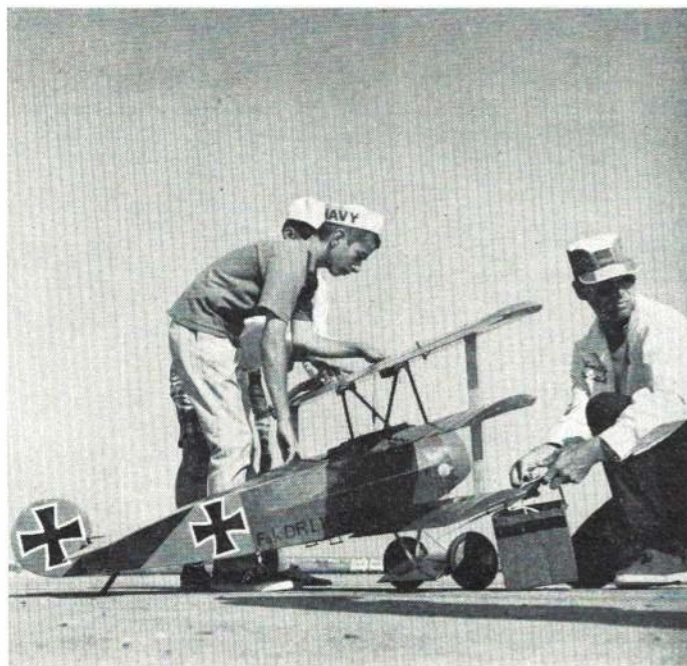


U. S. Navy photo

Bobby Hanford, Tulsa, reworked Indoor Glider to the last minute, placed 5th in Jr. event.



Graceful Indoor Cabin model of James Richmond, Chicago, Ill. Much of required cross-section in gear pylon. Richmond won Stick with record time.



William Laubengayar, Detroit, gets youthful assist with Fokker DR-1. Used Super Tigre 71, Micro-Avionics RC gear. Model had 70" span, weighed 12 lbs.

## INDOOR

Rubber Events Director:  
Tem Johnson

### CABIN

Junior	Time
1. Robert Dunham II	11:58.4
2. William Gibbs	11:58.0
3. Patrick Wood	5:58.1
4. Michael Wood	4:22.5
5. William Schlarb	3:44.0

### Senior

1. Jan Servaites	14:02.0
2. Susan Weisenbach	3:37.0
3. Thomas Mills	1:15.2
4. Mike Richardson	1:12.0

### Open

1. Bucky Servaites	20:08.5
2. A. Rohrbaugh	19:36.0

3. Manuel Andrade	18:11.4
4. Harold Crane	13:21.0
5. Jim Vale	10:00.0

## STICK

Junior	Time
1. Linda Randolph	23:12.1
2. Robert Dunham II	15:23.0
3. William Schlarb, Jr.	12:21.0
4. Kristi Tenny	11:05.5
5. Gerry Geraghty	9:40.5

### Senior

1. Jan Servaites	14:39.4
2. Arthur Markiewicz	13:33.9
3. Susan Weisenbach	7:32.7
4. Henry Nixon, Jr.	6:36.6
5. Thomas Rodgers	3:05.0

### Open

1. James Richmond	31:07.8
2. Manuel Andrade	28:08.3
3. Edward Stoll	27:22.5
4. Al Rohrbaugh	26:33.3
5. Bud Romak	25:59.1

## PAPER STICK

Junior	Time
1. Linda Randolph	15:30.5
2. Gerry Geraghty	12:52.7
3. Robert Dunham II	11:51.9
4. William Gibbs	11:07.2
5. Terry Buddingh	10:56.8

### Senior

1. Jan Servaites	12:41.0
2. Daniel Domina	9:34.5
3. Daniel Powell	6:19.0
4. Susan Weisenbach	4:46.5
5. Henry Nixon	4:05.9

### Open

1. Robert Randolph	18:40.0
2. Daniel Belief	18:35.5
3. Walter Mumper	18:34.6
4. Phillip Klintonworth	17:41.0
5. Charles Sotich	16:48.0

## H.L. GLIDER

Event Director: Bud Tenny

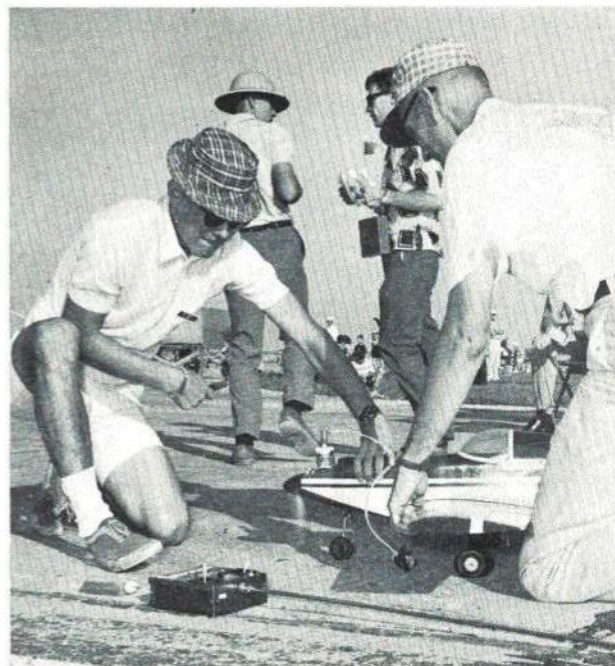
Junior	Time
1. William Gibbs	2:04.9
2. Robert Dunham II	1:50.8
3. Martin Thompson	1:48.8
4. Denny Dock	1:44.2
5. Bobby Hanford	1:33.1

### Senior

1. Arthur Markiewicz	2:10.6
2. Jan Servaites	2:00.7
3. Thomas Mills	1:48.2
4. Dan Wakerley	1:40.2
5. Mike Richardson	1:36.9

### Open

1. Donald Reed	2:10.6
2. Robert Larsh	2:09.4
3. James Mills	2:04.8
4. Richard Mathis	1:58.7
5. Glenn Lee	1:57.8



U. S. Navy photo

Firing up the highest placing Senior RC Pattern model is William Reed of Raytown, Mo. Father, Charlie, holds on. From KC RC Club.





Granger Williams and brother Larry with K&B 40-powered LaJolita RC pylon racer. Williams won RC Pylon event as well as RC Scale.



U. S. Navy photo

Ready to go in RC Pattern event are Mr. and Mrs. Roger Hooper of Oloha, Ore. RC judges on stand in background, three per flight.

## RADIO CONTROL

**DIRECTOR:** Ed Shipe

**Pattern Director:** John Patton  
**Assistant:** Maynard Hill

**Staff:** Dick Straw, Gene Smyers  
Howard Grogan, Phil Edwards, Joe Stream, Betty Stream, Kemp Bunting.

**Pylon Director:** Lou DeLateur  
**Assistant:** Bill Knost

**Staff:** Glen Spickler, Jim Kelly,  
Meyer Gutman, Jerry Kleinknight,  
Juan Martinez.

### FAI PATTERN QUALIFYING

Junior	Points
1. Robert Smith	1367
2. Michael Mueller	1299.6
3. Whit Stockwell	1283.6
4. James Hiller	934
<b>Senior</b>	
1. William Reed	1579.3
2. Dennis Sawyer	1434.6
3. Walter Schroder	1145
4. Kenneth Duncan	1096.6
5. Robert Kelly	1019
<b>Open, Novice</b>	
1. William Thomas	1602
2. Olin Koger	1419.3
3. Neil Udell	1418.6
4. Alan Dupler	1291.6
5. Fred Duvall	1166.6

### Open, Expert

1. Pierre Marrot	1801
2. Don Ballreich	1724.3
3. Jim Edwards	1714.6
4. Tony Bonetti	1713.3
5. Dan Carey	1673

### FAI PATTERN FINALS

Junior-Senior-Open	Points
1. Phil Kraft	3215.3
2. Jim Kirkland	3145.6
3. Jim Whitley	3121
4. Jim Edwards	3100
5. Larry Leonard	3016.3

### PYLON RACING

Junior-Senior-Open	Points
1. T. Granger Williams	21
2. Charles Downs	20
3. Donald Yockey	20
4. Joseph Foster	19
5. Larry Leonard	17

### Best Junior

Paul Stockwell

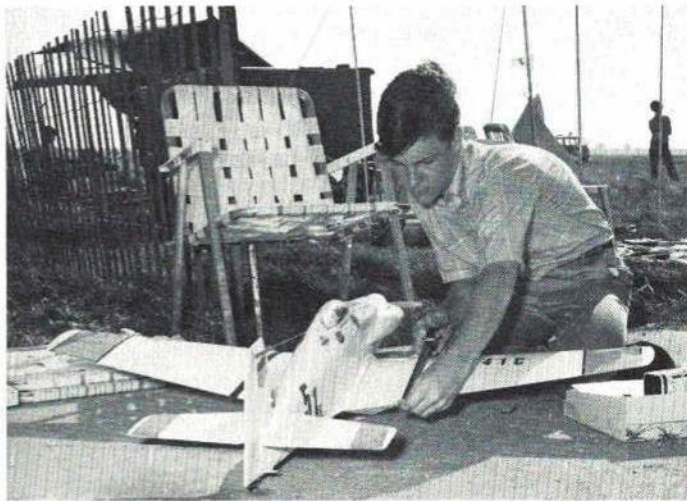
### Best Senior

Dennis Sawyer

### FLYING SCALE

**Event Director:** Bud Atkinson

Junior-Senior-Open	Points
1. Granger Williams	19,818.68
2. Dave Platt	15,840.10
3. Nate Rambo	14,870.60
4. Max Hester	13,527.00
5. Walter Burgin	13,183.50



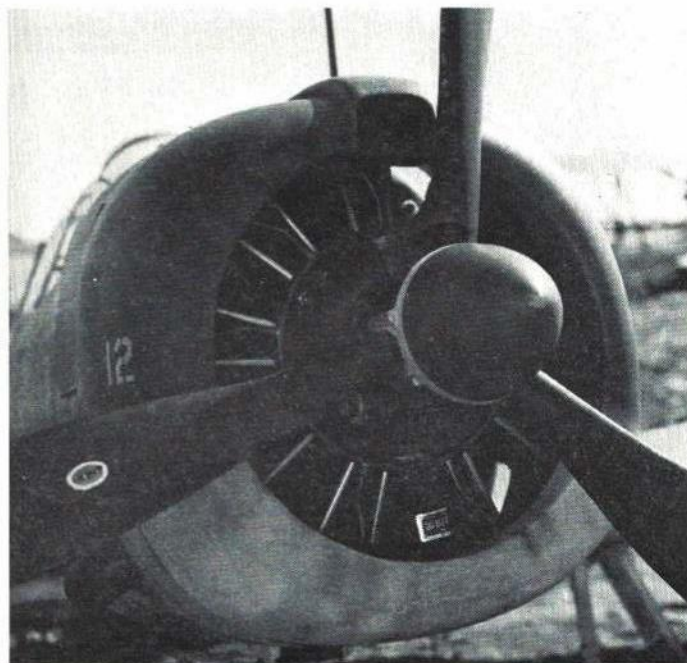
U. S. Navy photo

Whit Stockwell placed 15th among 20 finalists in RC Pylon Racing. He is from Encino, Calif., age 14. Used Stafford Minnow, K&B 40 RR, Kraft gear.



U. S. Navy photo

Vice Admiral Bernard Stream, Chief of Naval Air Training, looks over model of Pierre Marrot, RC Pattern champion of France. Asst. event director Maynard Hill at left. Model powered by Rossi 60. Marrot was top qualifier.



Dave Platt's Dauntless RC Scale model will be praised for a long time. Authentic even to the abrasions the much-flown original had. Took second.





Howard Mottin, Warren, Mich., handily won Open Navy Carrier I, but pictured Carrier II entry did not fare as well. Mottin is chairman of the AMA Control Line Contest Board.



Big rubber winner: Gary Heeb, Xenia, O., won both Unlimited and Wakefield, Junior, with dad's designs. Unlimited time topped Open.



Junior CL Flying Scale winner, David Salguero, Wichita, Kans., fueling up—buddy holding. Spad XIII, from Wylam plans, Fox 35 Stunt.



U. S. Navy Photo

The Nats was a family affair for Kathleen, 8; Joseph, 9; Charles, 11; Peter, 14; Mary, 17; and dad, Frederic Thulin, Jr., Mt. Prospect, Ill.

## Another Big Nats

Continued from page 45

rental for it). Also, cleanup of the contestant hangar was maintained by AMA, and contest tabulation was by an all civilian crew—the latter was basically an AMA crew with some additional help provided by Navy wives.

But there was still a large Navy crew involved in the meet operation and it was mostly a happy one. A big factor contributing to the generally excellent morale was the personnel staffing in a manner which permitted relatively normal liberty and leave status throughout the meet. An excellent job of pre-Nats briefing of station personnel had been done by both AMA and Navy officers, with the strong support of two commanding officers—Captain Frank Culley from 1967 thru June of 1968 and his successor, Captain John Chappell.

Mainly it was the BSG's who produced the Navy's basic effort which came off so well. The BSG's are the Baileys, Shiners and Grays—the Commanders (and their wives) who put in many hours above and beyond their duty assignments. In recognition of their efforts, the famed 8-Ball trophy was awarded to the BSG's at the Nationals—the first time that a triple award of this trophy has been made.

A brand new twist to this year's Nats was the delta dart competition. Operating completely independently of the rest of the Nats, but simultaneously with it, this four-day affair was mostly for new model flyers from the metropolitan Kansas City area. During pre-Nats promotions about 18,000(!) AMA Cub kits, purchased by community sponsors, were given away; mostly in shopping center programs and several Junior-only meets.

In a hangar set aside exclusively for delta dart activity, workshops were conducted to teach youngsters how to build and fly their first model airplane. From 2 to 5 pm each day there was actual competition for trophies, merchandise awards, and even trips on an aircraft carrier. There was much adult help, mostly by the Shawnee Mission (Kansas) RC Club and several from the Pittsburg (Pa.) ARKS club, plus other AMA and Navy help. Leaders and chief pushers from the local area in this effort were AMA'ers Ken Wilson, Carl Perkins and George Anderson; aided by Ralph Pennetti, Ruth and Dick Meyer, Ina and Bob Lopshire, the latter group from Pennsylvania.

The delta dart program captured the imagination of all who saw it and tremendously impressed Navy officials as the obvious key to future Nats emphasis. An expanded program for 1969 is already in planning, now that the concept has been proved as a sure-fire means of attracting youngsters to model aviation. The program is now likened to a ball club's farm system, providing the basis for grass roots youth interest and participation in aeromodel competition.

Considering that the 1968 National Model Airplane Championships started under a cloud of doubt concerning Navy hosting of future meets, the current situation is a dramatic turnabout. AMA did all that was asked to make the Nationals more manageable and youth oriented, so the Navy has given a vote of confidence to continued cooperation. The next Nationals is therefore in planning, scheduled for Willow Grove—near Philadelphia—in 1969. The exceptional cooperation this year between Navy, hobby industry and AMA leaders has given the '69 meet a green light, and if our '68 success is repeated or improved upon, there should be many more Nats in our future.

## AMA Meetings Held at the Nats

Although the time available for business was short many meetings were held by Academy committees, and many new developments resulted. The AMA Executive Council (board of directors) met twice; the Radio Control, Free Flight and Control Line Boards each met once, as did the Scale Advisory Committee and the Nominating Committee. Only the council and nominating meetings are reported here as the others required follow-up action after the Nats before decisions could be considered final.

**Executive Council.** The council meetings produced a new membership dues structure for 1969 emphasizing increased aid to Juniors, improvement in headquarters services, expansion of the magazine value, increased insurance coverage, reduced charter club fees, expanded flying site and publicity aids. Special services to competition flyers were also authorized, to be made available on an optional basis at cost.

The controversial question of whether a separate extra-cost competition license should be established was resolved by retaining the current arrangement whereby all members have full competition privileges. But a substantial dues increase for all Open members was approved which, in effect, would subsidize basic competition services (contest board operation, contest sanctioning, record processing, team programs) and Junior activities. Specifically, a general dues increase to \$10 for Open members was established, along with a \$2 basic fee for either Junior or Senior members. The Jr./Sr. fee is not to include magazine subscription, but the latter would be made

### 1968 Free Flight Team

**Power:** Bob Sifleet, Sandy Norton, Harold Spence

**Nordic:** Phil Klintworth, Jim Taylor, George Xenakis

**Wakefield:** George Xenakis, George Reich, Herb Kothe

## CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

Nov. 9-10 — Taft, Calif. (AA) WFFA Annual FF FAI Contest. Site: Gardner Field. B. Bogart CD, 469 Paulette Pl., LaCanada, Calif. 91011. Sponsor: Southern Calif. Aero Team.

Nov. 10 — Tampa, Fla. 3rd Annual Fly for Fun Contest. Site: 30th St. & Bougainvillea. D. Rothman CD, 1502 Heather Ave., Tampa, Fla. 33612. Sponsor: Tampa RC Aircraft Club.

Nov. 24 — Fresno, Calif. (A) Fresno Monthly FF Meet. Site: Near Kerman. F. Gallo CD, 1725 Kenmore Dr. W., Fresno, Calif. 93702. Sponsor: Fresno Gas Model Club.

Nov. 29-Dec. 1 — Tucson, Ariz. (AA) RCM 1st Annual RC Festival. Site: 30 Mi. N.W. of Tucson, Marana Air Park. K. McDaniel CD, 4808 E. Fairmount, Tucson, Ariz. 85716. Sponsor: Tucson RC Club.

Dec. 8 — Taft, Calif. (AA) SCAT Scramble FF Meet. Site: Gardner Field. B. Bogart CD, 469 Paulette Pl., LaCanada, Calif. 91011. Sponsor: Southern Calif. Aero Team.

Dec. 28-30 — Sebring, Fla. (AAA) 15th King Orange International Meet for FF & CL. Site: Air Terminal. S. Slater CD, 42 Magnolia, Sebring, Fla. 33870.

Dec. 29 — Fresno, Calif. (A) Fresno Monthly FF Meet. Site: Near Kerman. F. Gallo CD, 1725 Kenmore Dr. W., Fresno, Calif. 93702. Sponsor: Fresno Gas Model Club.

Dec. 29-31 — RCACF Field, Fla. (AA) Tangerine International RC Championships. W. Schoonard CD, 2080 Sharon Dr., Winter Park, Fla. 32789. Sponsor: Remote Control Assn. of Central Florida.



available at special low rate, for Juniors and Seniors only.

Special competition services are to be made available, at a cost of \$3 additional, to any AMA member desiring same. These services would include three basic items: 1. Competition news—a monthly newsletter with contest calendar, Contest Board reports, rules and record news, team selection information, major contest results. 2. Prestige identification—exclusive design decals for models and equipment, and other special identification items. 3. Rules vote—annual ballot type questionnaire to provide individual member inputs prior to final voting on rules questions; to provide the means whereby individuals would be informed on pending rules proposals and be given the opportunity to vote their preferences, for guidance of district Contest Board representatives and the board as a whole.

In other business, four AMA Distinguished Service Awards were authorized. Three were in connection with the '67-'68 Delta Dart Junior promotion program: Ralph Pennetti of Pittsburgh, Pa., for his leadership in pioneering how RC clubs could participate; Ken Wilson, of Shawnee Mission, Kansas, for his leadership of the '68 Nats program; to Glen Sigafoose, of Montezuma, Iowa, for production of Dart kits at a sacrifice to normal business activities. The fourth award was to Maynard Hill, of Silver Spring, Md., for his organization and conduct of the first international RC judges course, held in Germany last April.

A major improvement in the AMA membership and club insurance program was also initiated by the Council. Basic coverage was increased to \$300,000 (triple the current protection) and many clarifications of policy language and claims procedure were discussed. The Executive Director was instructed to negotiate the improvements.

**Nominating Committee.** Members of the 1968 committee (district vice-presidents of AMA) met on August 7 during the Nats. AMA Secretary-Treasurer Earl Witt was appointed by the AMA president as chairman. At hand was the business of selecting, from among names submitted by the AMA membership, nominees for the offices of AMA president, and five vice-presidents—for AMA Districts II, IV, VI, VIII and X. The election, going on as you read this (ballots were mailed to all AMA members early in October), is to fill these posts for the 1969-1970 term.

Selected to be placed on the ballot were the following:

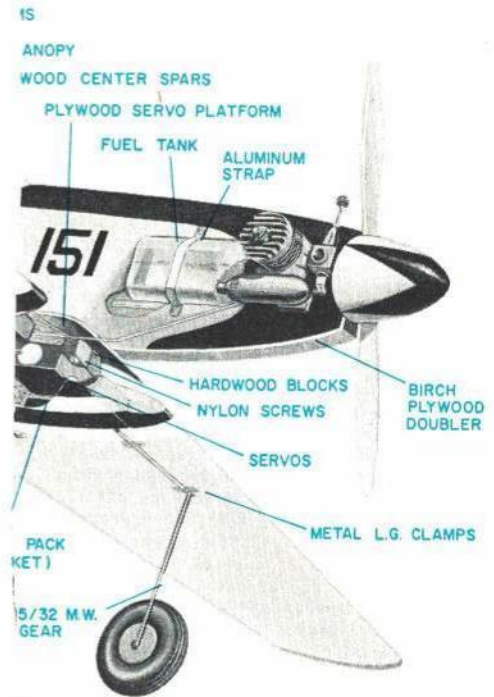
**AMA president:** John Clemens, John Patton, John Pond. **District vice-presidents:** II—William Boss, Art Schroeder; IV—Cliff Telford; VI—Carl Fries, Gosta Johnson; VIII—Bill Lank, Ralph Tenny; X—Vic Cunnynggham, Sr., Ed Shipe.

Early in the Nominating Committee's deliberations, concern was expressed that should all the proposed nominations submitted be accepted as candidates, the possibility would exist for a minority choice to be elected because of vote splitting between the more popular nominees. Upon motion duly acted upon, it was decided to utilize the procedure many times previously applied, to limit nominees for the office of president to three—and for the office of vice-president to two. Similarly, it was decided to provide write-in space on the election ballot to permit the casting of votes for others, in the event members do not agree with the nominees listed.

**AMA CLUBS HAVE INSURANCE  
TO PROTECT FLYING SITES!**



# IC IS HERE...



## Sky Mite

*Continued from page 29*

file templates. Drill  $\frac{1}{16}$ " holes about every 6" around the perimeter of the side profile templates about  $\frac{1}{4}$ " from the edge. Using round toothpicks, mount the templates on each side of the block lining them up on centerlines and squaring them across the block. You are now ready to cut out the side profile. This is done in exactly the same maneuver that foam wings are cut. Templates may be marked off in segments and numbered but this should not be necessary since the templates are only 4" apart and it is fairly easy to keep the cutting wire square with the templates.

After cutting, remove side templates. Prepare top profile templates for mounting. Since the top and bottom profiles are identical, you use half of the top profile template on the top and the other half on the bottom. This means you cut  $\frac{1}{2}$  of the top/bottom profile at a time. Mounting and cutting are done exactly as you did on the side profile.

Next, separate plug halves and permanently mount each plug half on one of the side profile templates. Now temporarily rejoin the plug halves with templates sandwiched in the center. Also, permanently mount both half circle templates on the front of the plug.

The next step is rounding the corners of the plug. You should first cut the 90 degree corners off with a sharp X-acto knife. The corners should be cut in pairs to keep the halves symmetrical. The plug will then be octagonal. The remainder of the rounding should be done with 320 sandpaper and a sanding block. The flat surfaces on the sides should also be sanded smooth.

You are now ready to cover the plug. The best material I have found for covering



# and it's almost ready-to-fly!

## PROFILE R/C MUSTANG

### \$34.95

KIT FS-23  
wing span: 55"  
length: 43"  
engines: .45 & up



A cinch to assemble! Flies like a dream! The most rugged R/C model of them all!

The ideal R/C Trainer — great for Sunday and Sport Flying!

IF YOU'RE A FIRST-TIME R/C FLYER — THIS RUGGED, EASY-TO-BUILD, EASY-TO-FLY BEAUTY IS YOUR PERFECT R/C TRAINER! IF YOU'RE AN "OLD HAND" AT R/C, YOU'LL FIND THIS FULL-HOUSE, FULL-SIZED PROFILE R/C MUSTANG IS AN ABSOLUTE DREAM FOR SUNDAY AND SPORT FLYING.

IT'S ALMOST READY-TO-FLY! HERE'S WHY! **FOAM WING:** Molded for accuracy (not hand wire cut). Panels come factory finished, and are assembled in a matter of minutes. Spars, landing gear beams etc., are already installed and wing comes already covered with a brilliant high-gloss white plastic skin that eliminates painting. Includes shaped, full length strip ailerons.

**PRE-ASSEMBLED FUSELAGE:** Practically all factory-built, the fuselage is just about ready for the single unit balsa tail surfaces. Factory installed in the fully shaped balsa fuselage are: the maple nut

blocks, maple motor mounts, birch plywood side plates, birch plywood wing saddle, etc.

**BENCH-TYPE RADIO INSTALLATION:** Where is the Radio equipment installed? . . . It's simply tucked away in the bottom of the wing on a plywood plate — with plenty of room to spare! A look at the cut-away shows how neatly the four servos fit . . . and it will easily accommodate any proportional type servos. The nicad battery pack slips into a pocket on one side of the foam wing, the receiver into the other. We know of only one receiver (and that one's a kit) that wouldn't fit. For this, all it takes is a small fairing. That's why this is practically a bench-type installation, requiring an absolute minimum of time. The molded hatch cover then slips into place completing the wing shape, hiding everything.

**And That's Not All!** Also included are nylon horns, nylon push rods, nylon wing screws, formed wire landing gear and retaining clips, decal insignia, clear

plastic canopy, a host of nuts, screws, etc. etc., and also one of the new 8 oz. Sullivan "see-through" R/C fuel tanks!

**Sterling**  
MODELS  
BELFIELD AVE. & WISTER ST  
PHILADELPHIA, PA. 19144

in this application is Scott paper towels. This material covers compound curves amazingly well when used with white glue. First separate the halves since each half will be covered separately. Spread a thin coat of white glue on each plug half. Now cover each half with a length of towel, three sections will be enough. Stretch towel around curves until surface is smooth. Do not cover the wing saddle at this time. Allow glue to dry and then trim excess towel away. Use thin cardboard or blotter paper and white glue to cover the wing saddle.

You are now ready to permanently mount and finish the plug halves. Any flat smooth surface is sufficient to use for a mount. Plywood or masonite work well. Secure the plug halves to the mounting surface with white glue. Now spread a coat of Hobby-poxy formula II over the plug halves. Use enough epoxy to saturate the towel but remove any excess glue from the plug halves. Allow to cure overnight.

The next step in finishing is to brush on about three coats of thinned Hobby-poxy Stuff. Allow each coat an hour drying time. Wet sand with 320 sandpaper between coats. Next spray or brush on one or two coats of auto primer, sand and spray on final finish. I find acrylic lacquer to be about the best finish in this application.

The remainder of the process is really very easy, although it is time consuming. This process may be used for making a mold for any design you may choose. The only special products required are Hobby-poxy formula II, fiberglass or polypropylene cloth and U.S. Gypsum Epoxical Release Compound.

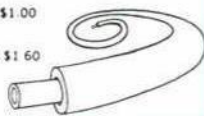
First inspect the plug halves for defects. Remember, the better the finish on the plug, the better finish you'll get on your female mold. Now spray on three or four coats of release, buffing all but the last coat.

## WE'RE EXPANDING NOW...

### GOODIES are GOODIER

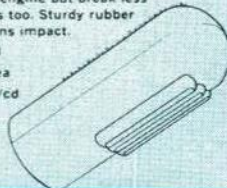
**No Bind Linkage**—available in bulk lengths, no waste. Outside nylon tubing is 1/4" OD, inside tubing 1/2" OD for smooth no friction fit.

≡213  
6 ft. bulk \$1.00  
≡214  
10 ft. bulk \$1.60



**Finger Guard**—really protect your fingers when starting your engine but break less props too. Sturdy rubber softens impact.

≡223  
95¢ ea  
6 pk/cd



**Wing Tach Kit**—Do away with unsightly rubber bands. Also can be used as a shock absorbing, blind mounting for nose wheel gears.

≡231 8/32 \$1.49 set of two 6 sets/cd  
≡232 1/4-20 \$1.49 set of two 6 sets/cd  
≡233 10/32 \$1.49 set of two 6 sets/cd



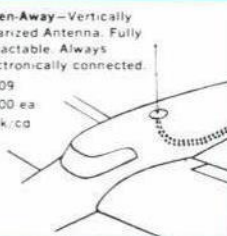
**Charging Plug and Socket**—Convenient plug-in for Ni-Cads. Tight fit assures good connection. Package contains plug, jack and mounting hardware.

≡247  
39¢/pk  
6 pk/cd



**Anten-Away**—Vertically polarized Antenna. Fully retractable. Always electronically connected.

≡209  
\$2.00 ea  
3 pk/cd



**Modeler's "T" Pins**—Finally, "T" pins of steel, available in bulk. One package will last and last and last and will save your thumb.

≡249 1 1/4"  
≡250 2"  
\$1.50/pk  
6 pk/cd



THESE ARE JUST SOME OF THE NEW GOODIES...WATCH THIS MAGAZINE EACH MONTH FOR MORE OF THE NEW AND COMPLETE LINE OF GOODIES BY

**MORE-CRAFT**  
MORE PRODUCTS FOR MORE ENJOYMENT

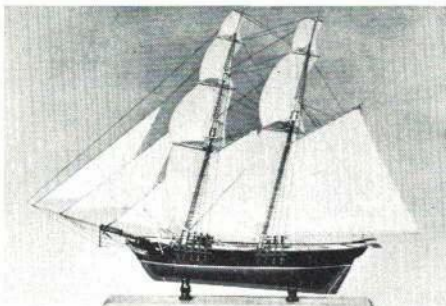
More-Craft Products Company  
Higginsville, Mo. 64037  
Mo. Residents add 3% Sales Tax  
Dealer Inquiries Invited



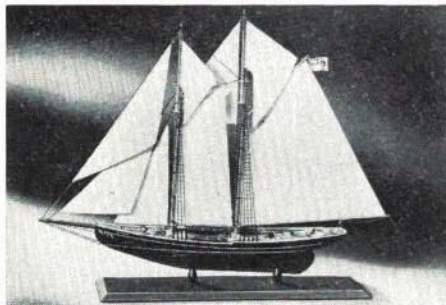
*Scientific*

# WOOD SHIP MODELS

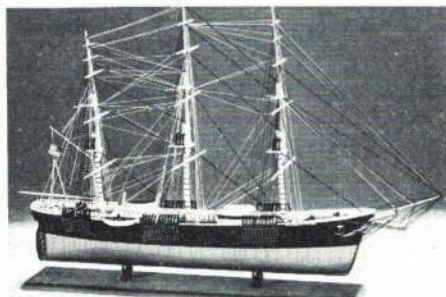
Kits include Carved Hulls • Metal Fittings • Display Stand



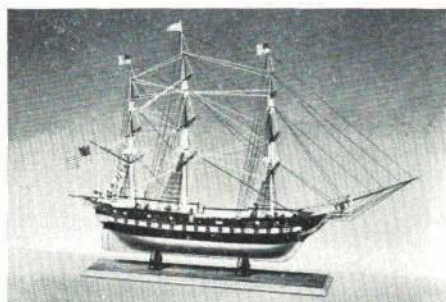
Kit 172 BALTIMORE CLIPPER, Dos Amigos. 22 1/2" Deluxe kit, printed cloth sails, metal fittings ..... \$16.95



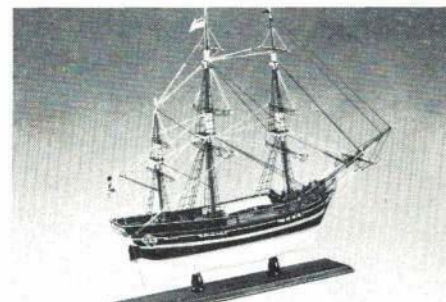
Kit 164 BLUENOSE, 24" Authentic sleek trim lines. Fine detail metal fittings, printed cloth sails ..... \$16.95



Kit 165 SOVEREIGN OF THE SEAS, 23 3/4" — 1852 model. Collector's model. Kit has finely detailed parts ..... \$16.95



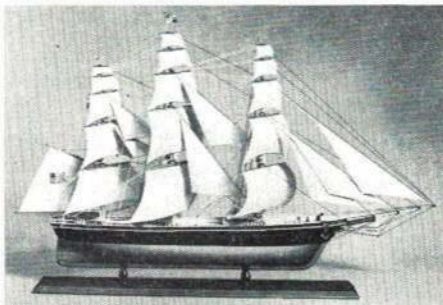
Kit 170 U.S.S. CONSTITUTION "Old Ironsides". Fought 40 battles successfully. Kit has cannons ..... \$8.95



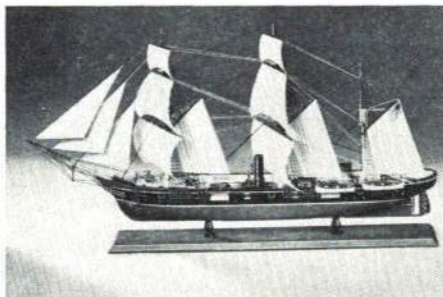
Kit 169 H.M.S. BOUNTY, 13 1/2" most famous ship in history. Display it in home or office ..... \$8.95



Kit 163 CUTTY SARK, CLIPPER SHIP, 23" exact scale replica of world's fastest ship. Printed sails ..... \$16.95



Kit 171 SEA WITCH, Big 27 1/4" super deluxe kit. Printed cloth sails, realistic metal fittings ..... \$16.95



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Mix up about two ounces of formula II and spread a light coat on each plug half and on a one inch border around the halves on the mounting platform. Allow glue to become tacky. Repeat with another coat of freshly mixed epoxy. Next drape a layer of fiberglass cloth on each plug half. For the first layer use a very light, fine grade of fiberglass cloth. Push cloth around corners so that it is in complete contact with the plug. Trim excess cloth away but leave a one-inch border of cloth around each half. Apply another coat of formula II and a heavy grade of cloth. This layer will give the mold strength and keep it from distorting with age. Cure molds for 48 hrs.

Remove the molds from the plugs by gently lifting from the edges. If the mold does not release easily, gently tap the surface with a mallet. Once the molds have been removed, you are ready to mount them permanently. Use the same material that you used for mounting the plug halves. Since the molds will have to be mounted in the platform, you will have to remove two oversize fuselage profiles from the mount. This will allow the molds to protrude through the mount and be secured to it by the one inch border or flange. Secure the molds in place with formula II at the flange. A frame of 3/4 x 3" pine should now be nailed on the bottom of the platform. This will make the mold more stable during molding.

You are finally ready to mold your fuselage. Inspect the molds for defects. Use Hobbypoxy formula I or II to correct defects and allow to cure. Now spray on two or three coats of release, buffing all but the last coat. Mix about 2 ozs. of formula II and pour 1 oz. in each mold. Spread the glue over the entire surface of each mold including the mounting flange. Lay a full length, full width piece of light-weight fiberglass cloth in each mold and then gently work the cloth until it is in complete contact with the mold. On tight curves and corners, you may have to cut and overlap the cloth. This will not present problems as long as there is at least one layer of cloth in all areas. Next trim off excess cloth but leave at least 1/4" border on the mold flange. Now lay on a second layer of cloth extending from the rear edge of the wing saddle all the way forward. Any excess glue laying in the tail of the mold can be moved forward to saturate the cloth. Lay on a third layer extending from the front of the wing saddle forward. Work into place in the same manner as before.

Each of these layers of glass should be saturated with glue but any excess glue should be removed. If it is not, you will end up with a brittle fuse. Cure 48 hours.

Remove fuselage halves from the molds. A few taps with a light mallet should free



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them easily. You are now ready to install the firewall and join the fuselage halves. The 1/4" plywood firewall, as per outline on plans, should be cut out oversize and trimmed to fit the fuse halves. Glue the firewall in one of the fuselage halves in the position shown on the plans. Now cut out the wing saddle opening and crank shaft opening, leaving about a 3/8" border around each. Next cut some one-inch strips of fiberglass cloth, one about four feet long and two about a foot long. Saturate these strips with formula II and attach them to one side of the fuse allowing one half of the width to overhang. Use the four-foot length from the firewall down the top of the fuse and double it back along the bottom to the wing saddle. The shorter strips are for the bottom, forward of the wing saddle and for the top and bottom of the engine compartment. When strips are in place, join, align and clamp the halves together by the flanges. Inspect the strips to make sure they are in contact with both halves. When the epoxy has cured, cut away the flange and file the joint smooth. Any holes should be filled with epoxy.

The engine opening can now be cut out. Make a small opening at first and then enlarge it gradually until the engine clears. Also, mark off and cut the rudder and stab slots, then insert tail assembly and epoxy.

The rest of the building process is pretty much standard and everyone has their own methods for gear installation, finishing, etc. There is ample room in the fuselage for any of the new digital systems. I used a Kraft 6-channel with four standard sized Kraft servos. With this gear, the Mite weighs just under four pounds and has plenty of zip with a Super Tigre 23 and a 9-4 or 9-5 prop. There is also ample room for a larger displacement engine, for those of you who are so inclined. The balance point should be located between 30% to 40% back from the leading edge at the center section. Even at 40% the airplane is quite stable, but will perform snapping maneuvers easily when they are called for. The long moments make the airplane easy to fly smoothly. This is very important in small designs, since they have a tendency to be jerky if they are short coupled. The Mite is quite predictable in entering and recovering from spins and snap rolls. The inverted flight characteristics are excellent.

To sum it up, the airplane is as flyable as any larger multi I have ever flown and in many respects more so. With slight modifications, I believe that almost any of our popular contest designs can be reduced 25% in size without sacrificing performance.

If you are a little bored with that 60-powered brute, maybe it's time you tried a mini multi. You'll find the Mite to be a real solid airplane, that's a lot of fun to fly.

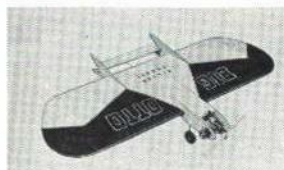
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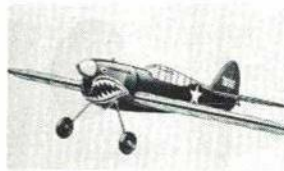
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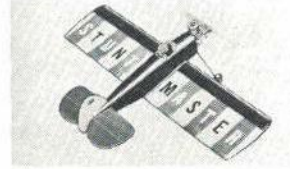
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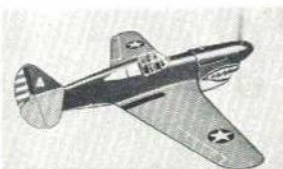
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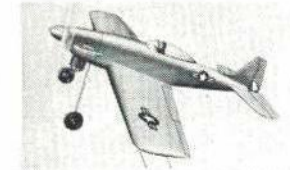
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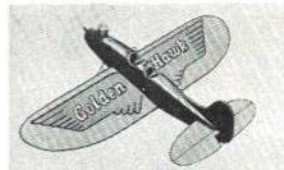
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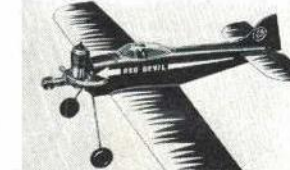
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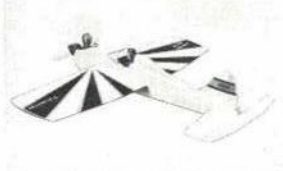
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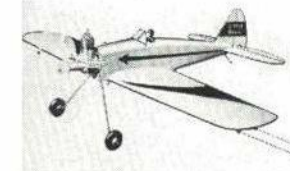
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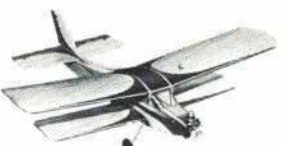
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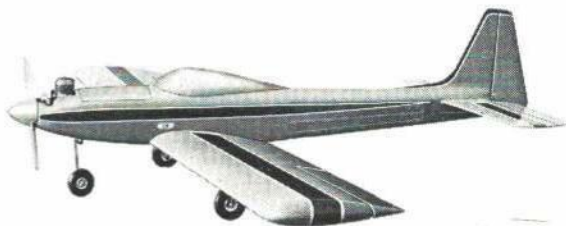
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### Straight and Level

Continued from page 6

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tion any youngster needed.

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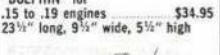
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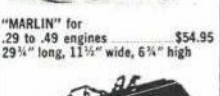
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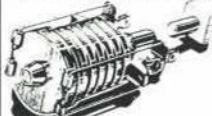


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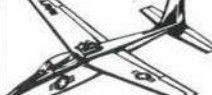
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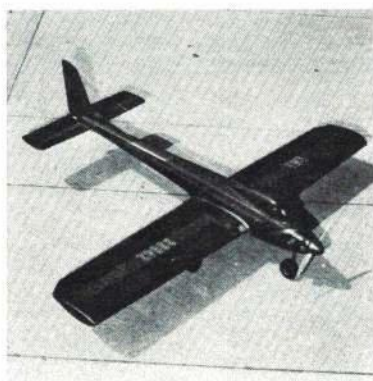


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## C/L World Champs

Continued from page 26

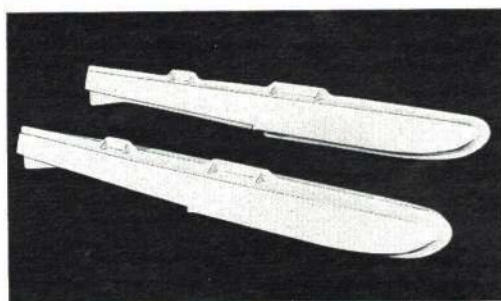
it was clear that low 4:30 times would be needed for a chance in the final.

Heat 2 with Italian brothers Magli, Finnish brothers Sundell and the German team of Meinhard/Jentsch, was the first race of the new Super Tigre rear induction team race diesel (not yet on sale) flown by the Italians. All of the Italians received these engines from the Super Tigre factory just before the meeting and this left them little time to get them sorted out and to utilize the engines' full performance. All teams started well, but the Italians overheated and Sundells' retracting undercarriage model suffered from a lack of air-speed. The first-ever South Africans at a World Control-Line Championship, Holz/Menges, were flying against Bulgarian brothers Lucher and the French Favre/Fabre team in Heat 4, but their hopes were dashed when their nicely turned out Jefe-type M.V.V.S. powered model bounced and lost its wheel, as pilot Niel Holz hit his handle against the French pilot's shoulder.

Heat 5 saw the first of the U.S.S.R. models in action, Plotsin/Timofeev against Dunking/Wright of the U.S.A. and the experienced Italians Fontana/Amodio. The Italian model cooked up while the Dunking/Wright's Super Tigre-powered model had to have the compression adjusted. The U.S.S.R. team had a very smart rivet-line, bedecked, lightweight (17 oz.) model powered by a Super Tigre G20D with a shut-off on the fuel line, and team manager-stunt flyer Juri Sirotkin, used a signaling board and a high frequency loud hailer to instruct pilot Kari Plotsin when to shut off and when to take advantage in the middle. The shut off certainly saved them time, as they could land just where they liked, when the other models were in the air. They cooked up at the end of each run though, and this slowed them to 4:49. But it was still second fastest time so far.

The third U.S. and Russian teams were flying in Heat 8 with Dutch lads Buys/Goudsmit. Marvin/Albritton from the U.S.A. were flying an H.P. 15-powered Jefe, while the internationally experienced Russians Zolotovech/Kobets had a really smart looking and unusual deep-bellied, faired-in undercarriage model, complete with large cockpit, AMA decal and bright decor. Unfortunately, the Marvin/Albritton's Jefe hit the Russian pitman on the arm at a pit-stop. While this slowed the U.S.A. up no end, it gave the Russians another chance for a re-run in the last heat, but Marvin/Albritton's 5:11 time was very good in the circumstances.

Team manager Peter Brandt protested against this decision, but the International jury did not change the verdict. Stockton/Jehlik were still way out ahead and a few teams were coming quite close to the 4:30 mark at this stage. Britain's best chance came in Heat 12 with Turner/Hughes flying against Fisher/Meusburger (Austria) and Mohai/Markotai (Hungary), all three of the teams being very experienced. Turner/Hughes had broken a conrod in their Don Howarth-prepared Eta 15 in practice — so they were using one of the new Eta Elite II's in standard form. While this had the speed of the Special, it



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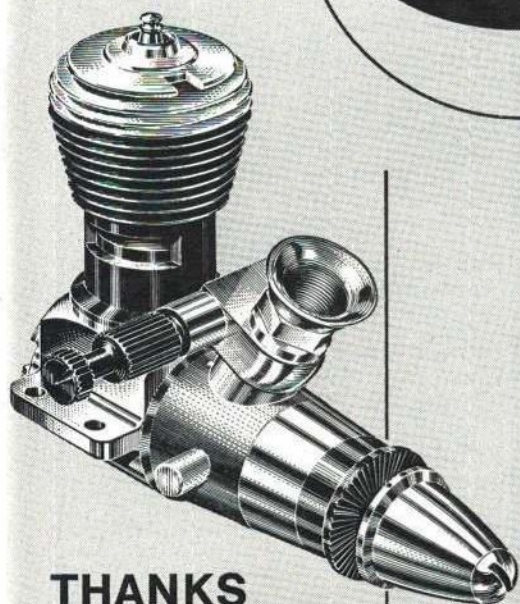
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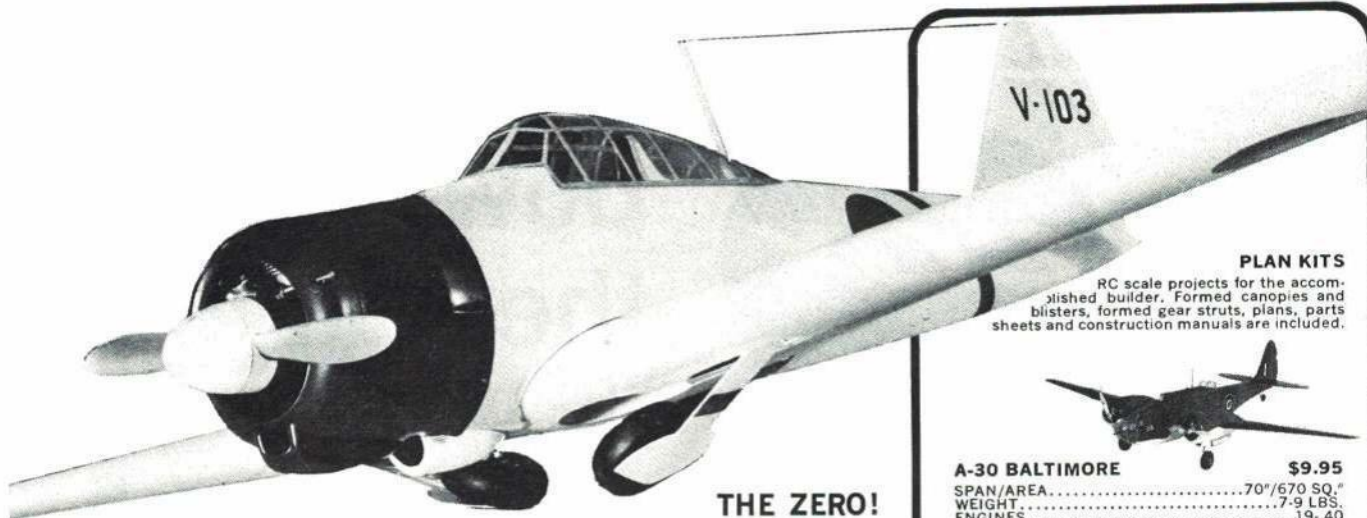
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was lower on laps and took more flicks to start. All teams got off well with the Austrians the fastest, and it was a close race. Fisher/Meusburger heated up a lot and did not finish. Turner/Hughes were going very well, but an extra pit-stop slowed them down by at least 15 seconds, for a time of 4:49, while the Hungarians made a faultless run for 4:37. This heat changed the order at the top and made it: 1. U.S.A., 2. Hungary, 3. G.B.

Heat 15 had the fastest Austrian team, Gurtler/Baumgartner, in it with slower French and German teams. The Austrians made three great stops, Gurtler really banging the model into the ground and Baumgartner pitting very quickly with his pressurized fuel system for 4:34, good enough for 2nd. The last race of this round, Heat 16, saw Bador/Bador retire with the West German Lutkat brothers flying against the fast Zolotovech/Kobets fuel-shut-off model on their re-run. The West Germans finished in 5:00 while the Russians took advantage of the easy race to make 4:55, doing 20 laps to a tank. The end of the first round left Stockton/Jehlik in the lead with Gurtler/Baumgartner 8 seconds behind the leaders.

Team race: Round 2 — The second round held the following day had just the same sunny weather conditions as the first, so engine settings could be left more or less alone. Round two is always more tense, as this is the last chance for a place in that Final to decide the Champion. Fisher/Meusburger (Austria) was the only team to break 5:00 in Heat 1 with 4:58, while a Dutch team retired and a Swedish team cooked up for 5:34. The Marvin/Albritton team of the U.S.A. lost a lot of time in Heat 2 when they dropped a catch and had to put a tire back on their wheel hub for 4:59, while the Russians Babichev/Krasnorutsky

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made 4:49. With Heat 6 things livened up a bit and Czechs Trnka/Drazek made a three-stop 4:48, with Britain's Heaton/Ross making a two-stop 4:53 — though they were slowed up by the questionable flying style of Juri Trnka. The experienced Italians Fontana/Amodio had an awful engine run and finished in 7:14. Two teams failed to finish in Heat 7, but the Czechs Votypka/Komurka made 4:49 with a beautifully finished Orion-type model with automatic filling and an M.V.V.S. 2.5 T.R.S. engine using a 180 x 180 M.V.V.S. propeller.


Heat 8 caused some excitement when the Austrians Gurtler/Baumgartner put in the second fastest time of the meeting, 4:30 with three pit-stops and flying against a Finnish and Hungarian team. They really banged their fiberglass-fuselaged model onto the ground and made the fastest pit-stops of the meeting. This did not change the positions for the final but they had cut Stockton/Jehlik's lead to four seconds. The South Africans Holz/Menges made a good start in Heat 9 with Hasling-Hasling (Denmark) and Billon Komorn (France), but they were set too lean and overheated badly. The Danish brothers flew on to finish in 4:41 from their H.P.-powered model. The crowds thickened to see Stockton/Jehlik in Heat 10 flying against the Bulgarians Rashkov/Tinev and Hungarians Mohai/Markotai. Stockton/Jehlik's Jefe started off well but slowed down and overheated badly — afterwards it was discovered that the H.P. 15 crankpin had turned blue through lack of lubrication, from the bell-valve induction system. Their time was still respectable, though at 4:47 for a sick run, while the other two teams were well over five minutes.

Heats 11 & 12 were really action packed. Heat 11 was tragic for the Czechoslovakians Dolejs/Klemm who made three great stops with 98-mph airspeed to record 4:29, good enough for 2nd place, but the jury found Klemm's tank to be 7.35 cc. Heat 12 was the main Russian bid for a place in the final. Plotsin/Timofeev really blasted their way through the Danes and Canadians (Kelly/Parent) flying with them, and using the shut-off to maximum advantage, made three very fast pits for a 4:35 time. Everyone was looking to Zolotovech/Kobets in Heat 15 to make a "final" type time, but they only recorded 4:58 against Dutch and Polish teams. Austrians Kropf/Nitsch went really well in the last heat but their H.P. 15D-powered fiberglass-fuselage model recorded 4:37 — just two seconds too slow for a place in the final.

So ended the team race heats with Stockton/Jehlik lined up against Russians Plotsin/Timofeev and Austrians Gurtler/Baumgartner for the final on the next day.

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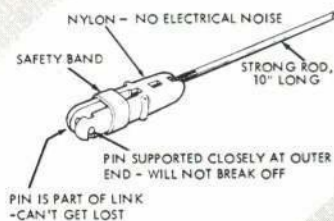


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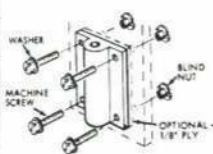


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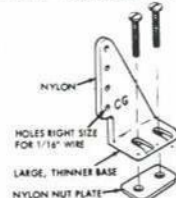
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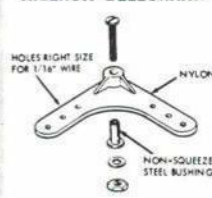
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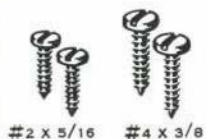
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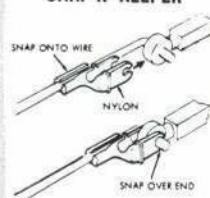
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and all three teams cranked up. Stockton/Jehlik were using a rubber bulb to pressurize the fuel into the motor (saves touching the lean-needle flying setting) while the Russians and Austrians pressurized their fuel supply by pushing the automatic filler valve onto the tank. The start countdown began and the organizers' air trumpet sounded the start of the Race of Champions.

Russia was first off with Timofeev flicking the motor three times, then Austria with three flicks in 2.5 seconds, but their engine cut in 1/4 lap, so Gurtler ran forward and got the model away from the Russian take-off segment; meanwhile Don Jehlik had flooded the H.P. 15-powered Jefe, and had to lift it off the ground, and turn it over to clear it. Lucky for him, the team race jury did not see it clearly. After 18 flicks the H.P. 15D started, but the Russian model had an 8-lap lead. Then the Russian came down on lap 36 after a signaled shut-off by pitman Timofeev, for a 5.5-second, two-flick pit-stop, then the Austrians came down on their lap 29 for a 6-second stop. Model speeds were about equal now, with the edge to the low-lap Austrian model. The U.S.A. landed for a 7-flick, 7.1-second stop on their lap 45. The Russians were down next and Kari Plotsin brought the model in a little too fast; it bounced, but Timofeev caught it and had the engine started with a single flick for a 8.5-second stop on lap 69.

Then Austria was down at 59 laps for a long stop (some 28.5 seconds), re-setting the compression as they were overheating at the end of each tankful. Then Herb Stockton brought the Jefe down in 1/3rd of a lap on the 89th lap and Don Jehlik took 11.2 seconds for 15 flicks. The Russians came in then for a stop on lap 102; three quick flicks and it was away in 5.5 seconds, but it still sounded over-compressed. Later, the





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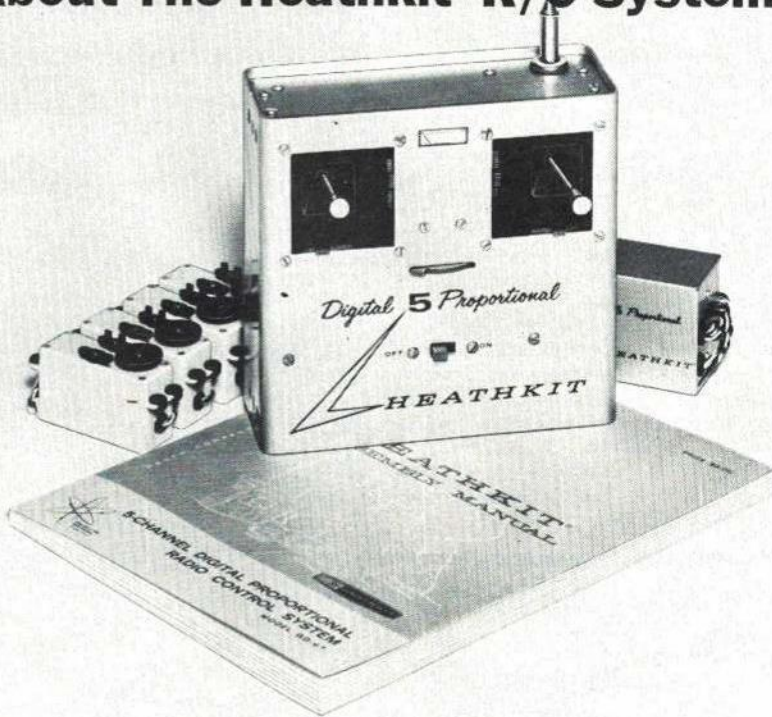
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Austrians' model came in really fast for a 2-flick, 5.8-second stop on lap 89. At this stage, Stockton/Jehlik's model was the fastest, the Russian's overheating a little. Austria came down at lap 129 for a 7-second stop, followed by Russia and the U.S.A. together. All teams were down. The Russians had two flicks, starting in 6.5 seconds on lap 136, while the Americans gave 9 flicks in 7.5 seconds on lap 134, then all models were away again. The Russians lead down to four laps with nearly 2/3rds of the race gone. The Austrians came down again at lap 152 for a slow (for them) 10.5-second stop and went off with a popping run that gradually came in. Then the Russians came down for their last stop at lap 172 for a 2-flick, 5.2-second pit, with the U.S.A. coming down just as Russia reached flying speed on lap 182 for a fantastic 17 flicks from Jehlik in 9.1 seconds, on the last U.S.A. pit-stop. The two teams were level now and two warning lights were flashing for both the U.S.A. and Austria's rough flying, then the Austrians made their last stop at 189 laps in 4.5 seconds, the fastest of the final. A few seconds later it was all over and Karl Plotsin shut off and landed having been beaten by Stockton/Jehlik, some 4 seconds or 1 3/4 laps ahead of them. The final times were: U.S.A. 9:19; U.S.S.R. 9:23 and Austria 10:28. This was one of the roughest flying finals ever, and under the circumstances the jury were very lenient with warnings (three mean disqualifications). If the Russians had pushed their luck to the same extent as the other teams the results would surely have been transposed for 1st and 2nd places.

**Aerobatics:** With the terrific turbulence caused by buildings, all aerobatic flyers were at a disadvantage. The most original models were by far the Italians, with rather old-fashioned-looking boxy designs, but extremely lightweight. While these performed some of the best aerobatic flights we have seen, in the calm evening air during practice, they were just blown all over the place during the contest. Bagalini's upright-engined Crop Duster type model, for instance, jumped four feet sideways in a wingover, when it reached the low building's roof-top height.

Quiet Texan Bob Gieske (he won the U.S. Nationals a week later), puffing his pipe and flying his Nobler-based model, impressed everyone the most in Round 1. Bob flew consistently level pullouts with steady square corners, but his intersections were poor due to his maneuvers being stretched on one side by the wind. His landings, though fast, were very smooth. Bob just greased the model in, in contrast to the lightning takeoffs and fast landings of the tandem-wheel Polish and Bul-

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garian models that just flopped in and made loud grinding noises from the assortment of piano-wire tip skids. The surprise performance was from Hank Twerda (Netherlands) who was one of the best on square maneuvers, even sharper than Gieske. While Steve Wooley with his new Cobra model pulled out very low on most maneuvers and rounded lots of corners off, he was strangely impressive, the whole flight flowing together very smoothly with Steve's relaxed stance adding to his score.

Unfortunately, only one Frenchman, Lauron, flew in the first round, as Souliac's and Billon's model had not yet arrived! His model was very heavy and he seemed to be having a lot of trouble just keeping it going in the right direction in the wind. Josef Gabris (Czechoslovakia), the eventual winner, and even then the current World Champion, was blown out of all maneuvers and scored more than 300 below the first round leader Bob Gieske, definitely not the usual Gabris performance. Team race pilot Kari Plotsin from the U.S.S.R. was another to fly a jet-like model and, while his square corners were sharp, his all-sheet-covered model wallowed after each turn and flew a little too fast.

Rudi Kessel (West Germany), as usual flew his four-year-old pin-stripe special model with an unsilenced Veco 45 that must have blasted the judges' thoughts away, but he was unimpressive and very ragged. This contrasted with Jim Silhavy's flight. As all who saw Jim's immaculately finished Nobler-type model called Gipsy fly in England will know, it is extremely smooth, but this time it seemed unstable and rocked a lot on the lines. It seemed as though the conditions were upsetting the pilot more than the model. But as the flight progressed, Jim became more relaxed and improved all the way through. At the close of



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Round 1, the positions were: 1. Gieske (U.S.A.), 2. Twerda (Netherlands), 3. Wooley (U.S.A.), 4. L.v.d. Hout (Netherlands) — with Twerda the real surprise.

Round 2 on the second day had slightly less wind, and because of this and the fact the contest was in full swing, nearly everyone improved on previous scores. One of the largest improvements was from Kari Plotsin who flew very smoothly, and this time a little slower, to earn another 556 points from his jet-like model. Kari is one of the few stylist flyers, and his poses during maneuvers suggest he is well aware of the pilot's impression left on judges. Ove Andersson (Sweden) came on really strong and his 2599-point flight was, at this stage, the highest pointed of both rounds. His whole flight was crisp and neat, the squares were bang on, and all his pullouts level. At the top end of the results, Bob Gieske made another consistent flight that left a far better impression than the first, but the judges only rated an 18-point increase to 2568 pt—I think a little unjustly.

Both of the top Dutchmen, Twerda and L.v.d. Hout, found the calm air helpful. It allowed them to use their larger-than-average models to full advantage. Twerda improved the most, and L.v.d. Hout enough to jump into 3rd position, as Steve Wooley (U.S.A.) did not improve appreciably enough to hold his first round position. Jim Silhavy put in a much better flight this time and thus elevated himself to 4th position. Meanwhile, World Champ Josef Gabris really improved and made one of his more usual smooth and good round-maneuvered flights to rack up 2622 points, some 398 more than his first round with the now two-year-old Super Master. W. Bagalini (Italy), with his "crop duster" style lightweight, flew far better. All his squares were very good, but the flight lacked smoothness.

With the closing order of Round 2 being Gieske, Twerda, L.v.d. Hout, Silhavy and Wooley, it remained to be seen if the next half a dozen including Andersson, Bagalini, Gabris could make a dent on the top men in Round 3. Both Gieske and Silhavy slipped down on points and the latter flew half his flight straight and level after the engine started coughing, due to a rich setting. This was thought by many to have cost the U.S.A. their team win at this stage, but Steve Wooley improved with his "Cobra" and helped to rescue the situation. Ove Andersson of Sweden made his best flight in this round, his neat silver-colored model performing all maneuvers admirably for a score of 2611, only 11 points behind Czech Gabris' total in Round 2. Gabris put on another good flight and scored 2607, which was just good enough to beat Ove Andersson for the final honor of being World Champion; twice in a row for Gabris.



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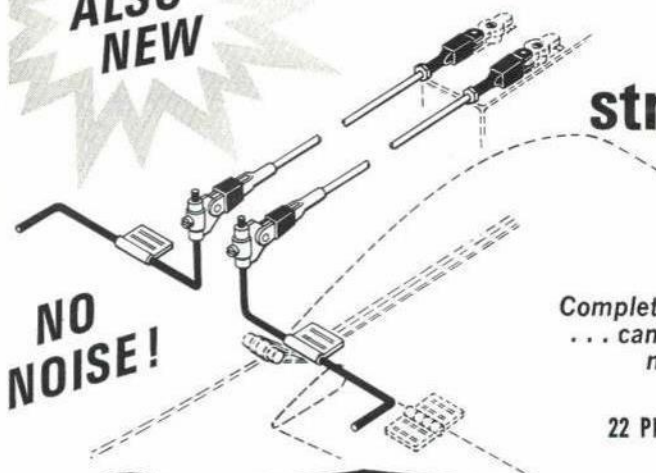
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### R/C at the Nats

*Continued from page 20*

at the end. An informal protest was made on the matter, but it wasn't till late that night that the reason became apparent to officials—the Flight Timer on this line had been mistakenly setting his clock to only ten minutes instead of the correct 11! Frantic phone calls and consultation among officials brought the conclusion that the only fair thing would be to run the other flyer group on ten minutes maximum on Thursday, and this was done. Whether these flyers were advised they were on ten minutes time, we aren't sure, but at least some told us they didn't realize it. It also came out that some flyers had been aware of the short flight time on Line A early Wednesday but had failed to bring it to the attention of the CD!

It became evident Thursday morning that there might not be time to complete a full six rounds, which would mean throwing out all 6th round scores that had been completed up to finish time. A call was made for those who knew they had no chance to place high to drop their last flights (this was entirely optional, of course). Only a couple did—and possibly from equipment trouble—but as noted previously, the sixth round was completed just within the time limit.

Final scores were the sum of the best two flights of each pilot (see AMA listing), and top possible score per flight for the FAI Pattern is 1900 points. We find only eight scores above 1500 in our unofficial tabulation, seven of them in the group that started at Site A on Wednesday, and only two scores over 1600. Latter were attained by Kraft and Whitley; former had the highest single flight score of the contest, 1643%. Again, those judges were apparently tough, and they didn't "go ape" on the last round, as has happened at some previous Nationals.

Throughout Qualifying and Finals, a few maneuvers consistently gave trouble, at times even to the top pilots. Meanest of all seems to be the Double Stall Turn. It may look fairly simple—but have you tried it?!

Main excitement in Pattern probably was in choosing the 1969 FAI Team, and we end up with a strong one, Phil Kraft, Jim Kirkland, and Jim Whitley, with Jim Edwards as Alternate. For the first time the South has really "arisen," with Kirkland, Whitley and Alternate Edwards near the top of the list of winners, and three more Southerners in the top ten. An area to reckon with in the future!

Scale: After the mixed-up and much delayed start of Scale last year, it had been hoped that this event—which sometimes seems almost to have "orphan" status—would get underway with a bang at 3:30 Monday when Pattern was scheduled to cease. But it wasn't to be. Pattern ran a bit overtime, but it did not matter—Scale flying did not start until about 4:30 anyhow. Despite much pre-Nats preparation by Scale CD Bud Atkinson, one outstanding difficulty was lack of any Scale judges. This was resolved when a group of Pattern judges volunteered to serve. Only a single flight line was used on Monday, and even though flying ran considerably later than had been scheduled, it was still possible to



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With no Navy Shore Patrol to police the site, the Scale pit area was practically a mob scene Monday with spectators (mostly model builders, as there were few non-modeling spectators at the meet) swarming all over the pit area and even the runway edges. By Tuesday things were under better control and Scale started almost on time. Ropes had been put up to mark off the pit area, and flights went rapidly from two lines. Since there was more runway space there, Scale was flown from Site B both days. It was found possible to complete four rounds; some had five flights and several Scale flyers said this was almost too much, considering the pressure that is present from flying these often overweight and tricky craft!

Though it was probably spelled out in some Nats information sheets, perhaps it was not made plain enough that the Scale flying on Monday and Tuesday was the *only* flying for these planes. Unlike Pylon and Pattern (and unlike Scale last year), there was no Qualifying-Final setup in Scale. Those who had expected to see a "Scale Finals" later in the week—and there was apparently a large number of them—were sadly disappointed.

Quite a few flyers passed many of their later flights. One who did this was Dave Platt, who put in a fine flight Monday after preliminary engine troubles. Dave apparently felt that his single Flight and Scale Operations scores of Monday would be sufficient to win the event; everyone conceded that his outstanding SBD-3 Dauntless would undoubtedly gain top points in the Scale judging that started Tuesday night (it did!). He had no flights on Tuesday, but many other high placers did, and many upped their Monday scores by larger margins. Thus Granger Williams came out on top by virtue of very high flying points. Only flyer to top Williams' 48.25 points for his best flight was Nate Rambo who had 51.5. Thus Williams came out on top with 19,818.68 with his venerable Nieuport 28 (refinished completely since its crash during test flying at the last Nats), Platt had 15,840.10 with the Douglas, and Rambo had 14,870.60 for his Chipmunk.

As usual there were some outstanding planes in the event. Even though he didn't place in the top ten, Don Neill put on a very convincing performance with his small (for a 4-engine scale job) B-17. It had 6½" span, was to ¾" scale, and flew fine. Also, the engines started in a hurry with none of the usual fuss and huge ground crew that often attend multi-engine planes. Don received highest "Scale Operations" points for the two days, reflecting all those extra engines.

Another multi-engine plane was an attractive P-38 by Bob Almes, but engine troubles kept him from doing much in the contest. Bob has a separate 1.2 AH nickel-cad cell hooked to the glow plug of each engine; starting is done with a separate heavy duty cell, then the 1.2's are switched on and left connected for the full flight. Purpose is to assure reliable idling, of course; if the small cells are not switched on till *after* the engines are running, Bob finds they will last for several ten-minute flights, since plugs are hotter when the engine is operating and the resistance is

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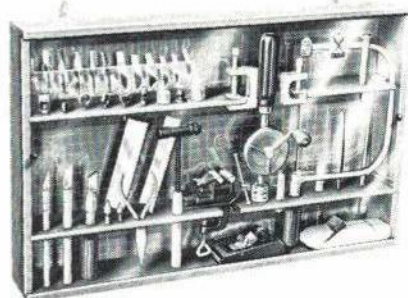
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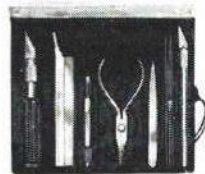
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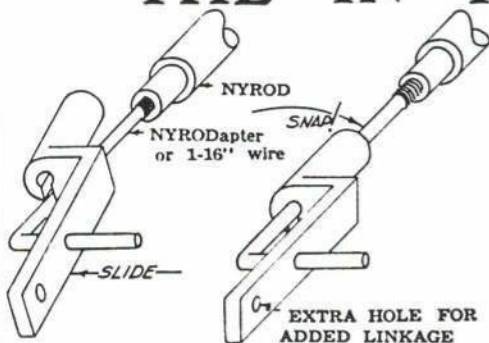
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### Group Plan #360 3 oz. 60¢

"Shoo-Fly" shoulder-wing radio control plane by Aubrey Kockman spans 43 inches, is 30" overall. Takes .09 or smaller engine. Extremely rugged; looks like Goodyear racer.

Fokker Dr. I Triplane as flown by Lt. Werner Voss in World War One. Control-line craft by Walter Musciano spans 24"; is 19" long; takes .09 to .23 power plant.

### Group Plan #1263 3 oz. \$ .60

Chance Vought F4U-1a "Corsair" control line World War Two Navy fighter plane by Walter Musciano scaled 1 inch to the foot; spans 40 1/2"; length 33" takes .59-size engine.

"Lil' Roughneck" radio control sport flyer by Aubrey Kockman can absorb plenty of punishment without damaging plane or R/C equipment. Rudder-only lightweight uses .010 power.

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much higher. The plane is of fiberglass and foam, has flown fine since the Nats.

Rather outstanding was a huge Fokker D-7 by Bill Bertrand, built to 3" scale, which gives a 97 1/2" span. Weighing 14 3/4 lbs., an OS 80 provided just the right power for good steady and highly realistic flight. Bill was awarded the Special Scale Achievement Award for his efforts, though he placed 10th in the winning list.

Only one Pylon plane was entered in Scale, which surprises us, since many of these craft are apparently very close to true scale copies. Bob Upton flew his Rivets in the event, its rapid flight contrasting greatly with the stately progress through the air of such planes as Bertrand's.

In many ways this was an outstanding Nats Scale event. Twenty-three entrants actually made flight points, and there was only one real crash (and that was no basket job). Truly the Scale boys are progressing in their painstaking craft!

**Awards banquet:** Some 200 modelers, family members, officials and Navy personnel gathered at the banquet rooms of the Glenwood Manor on Thursday night to bring the R/C part of the Nats to a fitting conclusion. MC's for the affair were Bob Lutker and Johnny Clemens, who kept the proceedings following a good dinner lively and funny. All R/C trophies and awards were handed out there, and there was a huge number of them. Besides trophies to top winners, the top ten qualifiers in Pylon and Pattern also received awards. Plaques were handed out to many who had a hand in running the contest, including the scorched judges. Award for Best Junior Performance went to Bob Smith. Awards went to top Juniors, Seniors and Open Novice entrants. Ed Izzo received a Sportsmanship plaque for volunteering to fly his only Pylon plane in the air show—which



as we've noted previously, cost him his chance to fly in the Goodyear Finals.

**Wind-up:** Planes were much like what we've seen right along in the Stunt category; there was no evidence of a trend to smaller stunters which some have predicted, and which seems reasonable in view of the much smaller and lighter R/C gear now available.

Equipment was also mostly what we've been using at least throughout 1968. One exception was a prototype single-stick Kraft transmitter, which had the rudder knob on the end of the control stick, trim levers around the stick mounting on front panel, and throttle and levers for added controls along the right case side.

French Champion Marrot startled the transmitter checkers when he presented a 32 MHz unit for their O.K. (this is a legal R/C frequency in France); however, he had one on 27 MHz also. Both were much smaller than any multi propo units we have here and are of the two-stick variety with trims for all controls including throttle. Unusual feature was an adjustment to change tension of control sticks.

We can't fail to mention the "Fly Seat" built by Ed Henry (member of McDonnell RCC), a beautifully designed and built unit that carries a multi R/C transmitter on one end of a pivoted boom, and a pilot seat on the other. A full-size-plane control stick, rudder pedals and throttle lever are used by the pilot, all being linked to the transmitter—a Bonner in this case. On the boom in front of the pilot is a field strength meter to give constant check on transmitter output. A "co-pilot" is required for operation; he turns the whole boom assembly around as needed, so the pilot is always facing the plane. Controls have artificial "feel" incorporated, and are spring-loaded to neutral; elevator and aileron trim levers are within easy reach of the pilot. Many flights have been made by several model pilots with this setup. Ed is now busy on the Mk II model—it will be a dual-place unit, and rotation will be by electrical means!

Before we close, a quick rundown of R/C Contest Board actions taken at the Nats meeting—subject to a final vote, but will most probably pass as outlined below. First, it was voted to retain the present engine size and weight specs for Formula I Goodyear planes (.29 engine max and 4½ lb. min., as had been proposed, are thus dead). The group voted to request official AMA competition status for the Formula II Goodyear category (those having 600 sq. in. minimum wing area); further specs will be presented for approval on this category in time for inclusion in 1969 rules, but probably any recognized racing plane may be copied, not just Goodyear racing types.

All ground maneuvers were eliminated from the Pattern rules (no more Proto taxi, Taxi back to hangar). Class A and B stunt programs were greatly changed, with many more AMA maneuvers added to A, quite a few of the FAI maneuvers inserted in B. More maneuvers will be added to the optional list in Class C; eliminated from latter are the vertical square 8 and the loop with 1½ snap roll; 8 point roll has been changed back to 4-point.

One last note—rumors were strong at Olathe that the Nats might be held at that N.A.S. again in 1969. Our information at this writing (two weeks after the Nats) is that the 1969 affair will go to Willow Grove (Pa.) N.A.S., per the normal schedule of rotation. See you there. . . .

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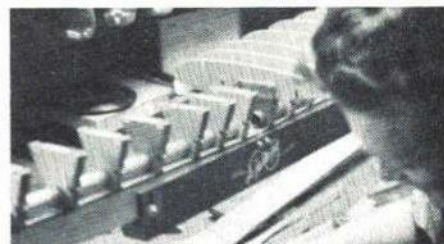
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## Cannon Carrier

Continued from page 30

Before you cement the fuselage halves together, insert stabilizer (part #3) using Testor's liquid cement. Cut a half-dozen lengths of masking tape (roughly 1/2" x 2"). After fuselage halves are cemented together, apply the tape across seams for extra tension until the cement is thoroughly dry. Criss-cross three rubber bands around fuselage, one near the front, one in the middle, and one near the rudder. While cement on fuselage is drying, cement wings (top and bottom). Use at least three applications of the liquid cement on edges of all parts. Securely tape the leading and trailing edges.

While fuselage and wings are drying, small parts can be painted as follows: Seat — medium gray; wheel centers — gray; tires — flat black with very small amount of white added. Propellers — flat black; struts — gray. Cannon can be painted either metallic black or very light blue. Tail wheel unit — black with gray center. Canopy frame — dark green.

By this time, your fuselage and wings should be dry enough to remove tape and rubber bands. Cement wings to fuselage; cement cowlings together and cement into position on leading edge of wings. Cement tail-wheel door in place. If any parts are not tight fitting, use Duratite surfacing putty in all seams and places where seams occur. Also use Duratite surfacing putty over window, which is actually heavy armor. After surfacing putty is dry, sand smooth with crosswise motion and contour to shape.

Locate and drill small hole for cannon; make template of cardboard stock (about weight of postcard or file card). This is done so that you can place the cannon at the correct angle. After locating, cement into position, checking occasionally to see that cannon has not slipped from its position.

**Painting:** Two color schemes are available to the modeler — the one shown on drawing and the one on model. The latter is painted as follows: Spray or brush-paint entire plane light blue. Next, spray sides of fuselage pale gray. Spray wings and stabilizer medium green. Use drawing as painting guide for splinter pattern, trace and mark off areas which are to be medium green. Again, using plan as guide, lightly sketch in with pencil the camouflage pattern on wings, decking and stabilizer. Mask off the areas you wish to remain medium green and spray exposed areas with dark green. Mask off wings near fuselage so that you will be able to spray your model dark and medium green for mottle on sides of fuselage and rudder. Mask off and spray the band (white on model) while tape is on fuselage.

The decals used on model are manufactured by Martin Karasel Studios, Culver City, Calif. The crosses and swastikas are from sheet No. 72-4. The wooden shoes, (the "Horst Wessel" insignia) are from sheet No. 72-9. The red "J" decal is from



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sheet No. 72-12, and the "N" I had in stock, manufacturer unknown. These same decals can be used for markings for making a model of the plane shown in drawing in article.

### THE MAIL BAG

This month's mail bag brought kits of great variety and excellent quality. The series of nine kits sent by Rovex Scale Models, Ltd., Westwood-Margate-Kent, was most outstanding.

The entire series compares favorably with the highest quality domestic kits. All parts are flash-free; detailing is excellent, with very fine lines and all kits are well engineered. Decals are matt finish, instruction sheets very well done, each kit has full color painting guide. Box top art is good enough for framing.

1) McDonnell Phantom F-4 KM: color guide for Fleet Air Arm in RAF, decals for either version.

2) Ling Temco Vought A-7A Corsair 2: color guide for Attack Squadron VA-122 and VA-147.

3) Lockheed F 104: choice of decals given for four Air Forces: a) J. G. 71, "Richthofen" Federal German Airforce; b) 9° Gruppo (Caccia Ogni Tempo), of 4° Aerobrigata Italian Air Force; c) Royal Danish Air Force; d) No. 322 Squadron Royal Netherlands Air Force.

4) MIG 21 Fishbed: choice of decals for four Air Forces: a) Russian, b) Egyptian, c) Iraqi, d) Finnish.

5) Blackburn Shark Torpedo-Bomber: with floats or wheels, choice of three color schemes: a) Royal Air Force version—820th Squadron, H.M.S. Courageous; b) Shark Trainer; c) Portuguese Air Force.

6) Westland Lysander: MK 1 or MK 3, Spy Plane, choice of decals; two Secret Agent figures. MK 1/No. 2 Army Co-operation Squadron, France, 1939. MK 3, Spy Plane/357, Special Duties Squadron, 14th Army, S. E. A. C., Burma.

7) First 1/72-scale kit of Junkers JU-87G Tank Buster: Hungarian Air Force, 1943 102/1 Dive Bomber Squadron, DCS STAB/Stuka Geschwader 2, color schemes of Hans Rudel, WW II ace with 1,000 tanks destroyed.

8) Northrop F-5 Freedom Fighter: decals for the following: Royal Canadian Air Force #332rd Squadron, Royal Norwegian Air Force.

9) D. H. Mosquito, MK 2 and 6: Includes parts and markings to make fighter or bomber. MK 4 Bomber—J. de L. Wooldridge, C/O 105th Squadron, 1943. Royal Australian Air Force.

Also excellent decals for Savoia Marchetti S. M. 79 from Exact-A-Cat Decals; these fit Airfix and Artiplast Spanish Civil War or WW II Series 1, No. 1. Booklet of color schemes and color chart shows different camouflage patterns for 14 planes. These are recommended for good quality. Exact Scale Hobbies, 97 James Street, Bloomfield, N. J. 07003.

## Getting Started in R/C

Continued from page 43

purchase that new outfit!).

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One might think from the above that the average R/C has about one chance in a thousand of making a successful flight without interference! Such is far from the case, though, and if you are aware of the possibilities (and especially if you can monitor your own frequency) you really have little to worry about. Experienced R/Cers in any given locality usually know what frequencies to avoid; check with them. So do local hobby shops (at least those where

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there is someone who knows more about R/C than just what the various systems cost!). And remember, most "interference" comes from troubles right in your own equipment. Check and maintain it well, utilize the most interference-free frequencies, and know what possible signals might bother your equipment.

## R/C Los Angeles

Continued from page 35

through a rubber membrane).

Framework is built upon a 1/8" sq. crutch formed of the backbone and a keel. Each bulkhead is one-half of a circle and of 1/16" sheet balsa. Crosspieces under each bulkhead are also 1/8" sq. Crossbraces radiating from the center of the ship and outward to the bulkheads are 1/16" sq. Bulkheads are not notched for them.

On each half 25 1/16" sq. stringers were used about eight degrees apart—could probably change this to 10 degrees apart to simplify matters. After erection of the bulkheads on the crutch, remaining halves of each bulkhead were cemented in place. Lastly, the stringers were added, this being done off the workbench and in the hands, so to speak. Two 1/16"-dia. aluminum tubes are used for the fill and vent. Both fill and vent should be on bottom of dirigible—the top; rear location for the vent is wrong. Vent must be on bottom so heavier air can escape and be displaced by the lighter helium.

The cabin is a very light framework fitted to the body first, but not cemented on until the body has been covered. It had windows in it but they were left without plastic covering. Escapement was connected to rudder with monofilament lines (externally).

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A three-volt Micro-Mo motor was the power driving a 2½"-dia. plastic prop from a plastic model kit. Battery power was taken from the very smallest of pencil-type dry batteries. Batteries are connected to motor with small, enameled copper wires (externally). Motor is mounted in small, hollowed-out balsa pod. Other dummy motors—not shown in pencil drawings—were made the same way.

Tail surfaces all of ¼" sheet, hinging of ⅛" wire and ⅛" aluminum tube. Tube must go through fuselage vertically to eliminate leakage. Short alternating sections of tubing may be silked to ⅛" sheet. Fin braces radiate (there are eight of them) from four equidistant points around the fuselage. You can label these points "X." They branch out and go to opposite side of each fin at points "Y."

No C.G. position. Just add clay until dirigible balances in a slightly nose-down condition (under power the nose will come and a shallow climb results). Addition of clay also allows the modeler to regulate the amount of lift useable. You don't want too much. Helium is retained for about 20-30 minutes. Payload is about 8-10 oz. depending upon atmospheric pressure.

## **Model Rocketeer**

*Continued from page 33*

Valley Section, NAR, Harrison, N. J.; Editor: Bob Mullane-NAR 4157)

### **SATURN-V APOLLO PLANS FROM NARTS**

An interesting, short time only offer is being made to NAR members and non-members alike to purchase from NAR Tech Services, original, finely detailed plans of NASA's Saturn-V Apollo space vehicle. The plans, for \$1.50 per set while they last, consist of four sheets measuring 11 x 45 inches.

This offer to rocketeers and collectors of the official NASA scale drawing will only be available to the general public for two months. All other items from NAR Tech Services, 511 South Century, Rantoul, Ill. 61866, are for NAR member purchase only and must include their NAR number. For the uninitiated who have never laid eyes on NASA plans for their big birds, a rare experience is in store for you when you first unfold this set on America's giant spacecraft.

### **SHORT BURSTS FROM THE PAD**

One NAR Section, The NAR Orbiters of Rochester, N. Y., is taking steps toward establishing a permanent launching site in Monroe County. Recently, the section flew over 100 rockets with all but one recovered, despite the presence of some max winds for model rocketry. The superintendent of Monroe County Parks was a distinguished visitor. . . . Members of Fairchester Section, Stamford, Conn. claim second largest NAR section in U.S. with 50 on rolls. Any disputes?

Send your section calendar of events in for announcement.

## **Radio Control World**

*Continued from page 39*

info from diesel experts, as to the proper fuel formula for such a tiny engine. Dave has built several tiny planes, pix of some of which have been in this magazine; he is especially interested in indoor R/C flying, but areas available locally are too small to allow practical electrically-powered planes, from tests Dave has made. His lightest electric plane weighed 3 oz. and the available power was marginal; Dave feels it would be impossible to turn such a craft tightly enough to fly it in his local indoor sites, hence his turn to diesel power.



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**Grassroots**

**Safety note:** A comment in newsletter of the Monmouth MAC (c/o Dick Sarpolus, 52 Alameda Ct., Shrewsbury, N.J. 07701) emphasized that, with sunglasses on, it is hard to distinguish some of the colors used for transmitter frequency flags, and that such flags should also have the frequency printed on the them. Most of us fly with such glasses, some of which have considerable color in the lenses.

**Picking committees:** While attending a meeting of the Twin Cities Whirlwinds (Benton Harbor, St. Joseph, Mich.) early last summer, we noted a novel method of picking committees and workers for projects, when there were no volunteers. When pres. Dick Cowan asked for a few members to volunteer, the usual breathless silence prevailed. So Dick called for his "number list," selected several digits therefrom at random, and the secretary read off the members names from the club roster. The "victims" didn't seem to protest too much!

This 40-member club is located along the shores of Lake Michigan where some beautiful slope soaring sites exist, but only a couple have tried gliders. Walt Good and yours truly offered some glider propaganda and apparently interested several converts. Previous to meeting, we had been shown through the nearby Heath plant by R/Cer Bill Hannah (one of the "fathers" of the Heathkit digital R/C kits), a most impressive tour. We also saw the 1969 line of Heath R/C gear—all we can say at this point is that it will be very much expanded!

**Competition**

**ABC doing well:** Further info on the Sands Point N.A.S. contest sponsored by the Seattle RAMS comes from Jerry Leake (6441 129th S.E., Bellevue, Wash. 98004), who gives a rundown of the Stunt events. Jerry

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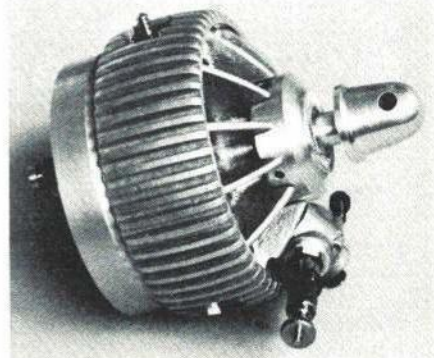
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feels the turnout was very promising, and that it shows the new rules may be doing the job intended. The entries were over double those of the same meet in 1967! Nineteen entrants flew classes A, B and C Novice on Saturday at Gold Creek Park; on Sunday another 19 entries battled it out in Class C Expert at Sands Point, where Scale and Goodyear were also contested. Jerry, too, has joined the "get the youngsters flying" group. His son Gary, flies his own deBolt Champ decked out like an L-19 and with Fox 19 (Bramco throttle). It flies with rudder, elevator and throttle on PCS gear, had logged 30 flights. Jerry is now flying a modified Quik-Fli with ST56 (Kavan carb.) and Micro-Avionic equipment.



Here is the latest in a series of experimental Wankel model engines by the Johannes Graupner firm. Front of engine was reduced in diameter; the balance weight is no longer visible. (Probably located in the large prop driver.) Note the single glow plug and the exhaust port behind the throttle's needle valve. Size is .25 cu. in. and the weight approximately 10 oz.

Ninth N. Y. State champs: Forty-eight contestants battled it out in fine weather at this traditional meet, sponsored by the Radio Control Club of Rochester. This was one of the meets designated to choose a Nats R/C F.A.I. qualifier, and Tony Bonetti (Emerson, N. J.) won this honor by topping Class C Expert. Other Winners: C Novice, Michael Heckler (Ontario, N. Y.); Class B, Norman Bell (Plainville, Conn.); Class A, Ralph Perillo (Buffalo, N. Y.); Continental Pylon, Bob Noll (2:21 time); Goodyear Pylon, Dennis Sawyer. There were five Scale entries, event won by Hale Wallace (P-63 King Cobra). Charles Petrevan got a real ovation when he landed his Albatros, which flew at near Scale speed. There were approximately equal entries in the four Stunt classes—looks like it may be catching on here too. Only two crashes in meet—one pilot had hooked his elevator backward during a rush equipment installation (taxied off runway into a log!). Even though some of them had heard the routine before, contestants, spectators (and Judges!) were again amazed at the running comment from Harold Goldklank during his flights; this time all hands were so entranced they failed to take any photos (even the pro photogs were spellbound!). Bob Clemens who sent the pix, says plans are already underway for the Tenth Championships, and another flight line will be added for Stunt.

**Airmail event:** Even though there were only nine contestants—two teams of four each and one standby flyer—this fun-fly event by Denver R/C Eagles may be of interest to other clubs. M. E. Rebhan (518 Magnolia St., Denver, Colo. 80220) sent the info. Basic idea is a "Competition for air-



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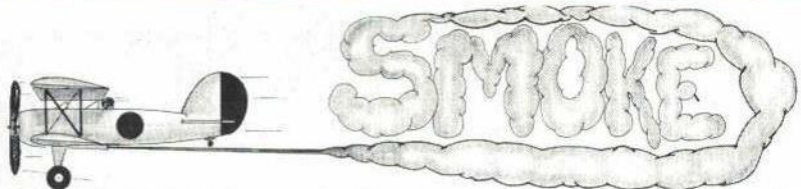


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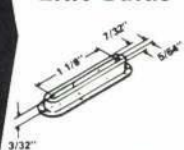
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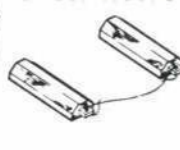
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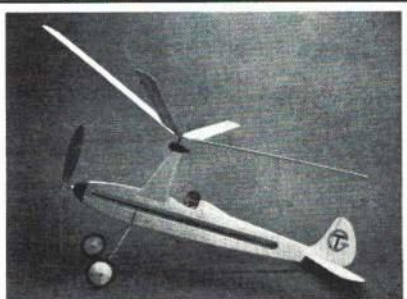
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after hat-drawing. The D.R.C.E. used little cloth bags about 2 x 4" for the mail sacks, numbered for the various teams. For the first try, the "Mail Contract" consisted of four quart cans of fuel, one awarded to each member of the winning team.

DC/RC "Mirth Of July": We like to mention meets with "different" events, in the hopes that such ideas will be useful to other groups. The "Mirth" was certainly different! Held July 13-14 at Frederick (Md.) Municipal Airport, it was reasonably hot, wind was light—generally good flying weather. Biggest entry was in the Gliding event in which any type of plane could be flown, powered or otherwise. We found all sorts, from small gliders up to real soarers, and including stunters. Also, all equipment types from single-channel escapement to full-house propo. Three-minute timed flight started as model left tow-line (or when engine stopped, on powered planes). Touchdown times over or under exact three minutes meant minus points. Spot landing and landing perfection also included in score. A popular event, easy to judge, open to any sort of model.

The Soaring event was strictly for gliders, all being launched by hi-start. Object was to stay aloft as long as possible, and spot-landing points were also awarded. Thermals were light but several pilots had flights of around 10 minutes. The FAI 1.7-meter event (April 1968, p. 72) really required special planes, but several standard types were modified to fit the requirements. Several of the planes were made to the new rules. However, a modified AMA pylon delta won the event. The other event was for WWI scale planes, and included acrobatics, and WWI ground judging. There were eight entries here; Gliding had 21 flyers, Soaring brought out 11, and FAI 1.7 and 7. Top winners: Soaring, Joe Roslyn; Gliding, Austin Leftwich; FAI 1.7, Leftwich; Scale WWI, Bernie Murphy (flying Nieuport 17 from VK kit). Hewlett-Packard Spectrum Analyzers were used as monitors. An unidentified signal was

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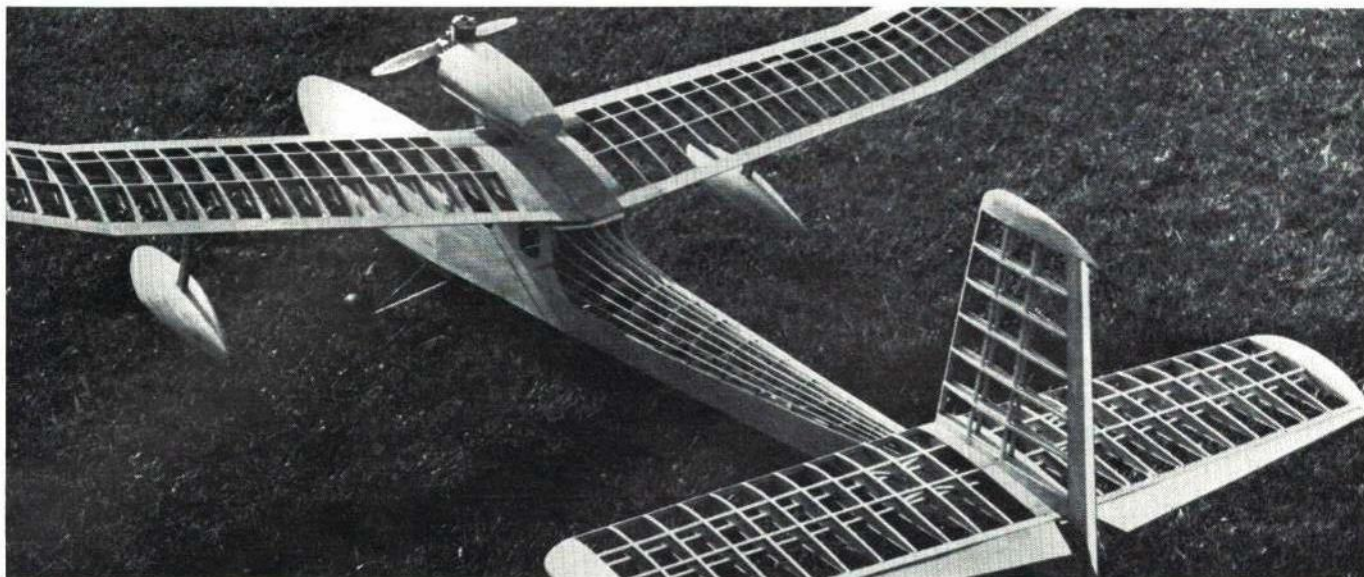
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spotted on the 50-mc band, thought at first to be a transmitter inadvertently left on in a car. Turned out to be the radiation from the oscillator of a superhet glider receiver which had been left on!

**Mid-Winter Meet:** The 1st Annual Tangerine International R/C Championships will be sponsored on Dec. 29-31, by Remote Control Assoc. of Central Florida, the Spaceport Radio Control Club and the Winter Park C. of C. Site is 40-acre RCACF field which has large paved runways and a control tower. Pattern events will include classes A, B, C Novice and C expert. There will also be Scale, Open Pylon, Carrier and Limbo events. Trained judges are promised, and special trophies designed especially for this meet will be awarded for top three placers in all events. There will also be a Grand Champion and a Sportsmanship award.

The sponsors tell us they will even have planes to loan contestants, if needed! Full info may be had from Walt Schoonard (2080 Sharon Dr., Winter Park, Fla. 32789).

**R/C auto Grand Prix:** Big event was planned for July 27-28 in Santa Ana, Calif., a time when everyone out there knows it can never rain. But it did! Nevertheless many races were run and a fine meeting was had by all. Though most entrants were from California, a few came from Indiana, Arizona, even one from the Philippines!

Saturday was spent in testing and tuning up the cars, and meeting other enthusiasts, with a banquet that evening. Sunday morning, when all hands were ready for official racing, the rains had swamped the course. But lots of broom work cleared off the track and racing could be started. Events were the Concours d'Elegance (scale judging for scale fidelity, workmanship, finish, etc.), a Sla-

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lom race around four obstacles, Time Trials on an oval track, an Indianapolis race, and finally, the Grand Prix road race. Points were given for places in all events, added to determine overall winners. Top winners were: Norb Myer, Bob Blair, George Siposs. This info from "Rev-Up," official newsletter of the Radio Operated Auto Racing Assoc. (625 S. Euclid, Anaheim, Calif.), which sponsored the above affair.

### NEW IN R/C

Experimenter's integrated circuit kit, low cost, under HEP program of **Motorola Semiconductor Products, Inc.** (Box 955, Phoenix, Ariz. 85001). Contains five top-grade IC's with reference folder on integrated circuits in general, these units in particular. Eight circuits given (several adaptable for R/C experimentation). Kit, HEK-1, costs \$3.95.

Late models larger Supertigre engines (.51 - .71) equipped with new throttle, according to **World Engines, Inc.** (Cincinnati, Ohio 45236). Throttles have needle valve at each side, for low and high speed adjustment; one of these needles (the idle one, we presume) moves in and out with the throttle body. Idea is to achieve better low speed and good transition from idle to higher speeds. W. E. claims it is easy to attain reliable 2500 idle — with heavy prop and spinner, down to 2100 safely. Throttles will be available separately.

In four different forms, from assembly kit to completed plane with engine and radio, fully test flown, Aero 2000 new from **Fly Away R/C Models** (1211 Pebble Creek Rd., Marietta, Ga. 30060). Semi-scale version of Aero Commander 200, plane designed especially for Class C R/C stunt competition under 1968 AMA rules. Kit only, \$31.95; many parts for plane produced by Lanier Industries. Assembled, ready for engine and radio, \$75. Assembled, with engine and radio furnished by buyer installed (test flown and trimmed, if desired), \$115. Complete with Kraft or PCS radio and .60 engine, fully test flown — \$495. Available only direct from maker.

West Coast R/Cers, especially in San Francisco area, have for some time found **Wintronix** (632 Miller Ave., San Jose, Calif. 95129) a convenient place to take equipment for repairs, but in view of rapidly growing servo business, general R/C repair work has had to be dropped. A new line of sub-min servos, based upon the tiny PS-3 Orbit mechanical parts (.9" wide, 2.63" long including grommets, 1.53" high case) is being offered. Tailored to many of the present and older systems, these servos are for all systems that utilize 4-cell batteries in the model. They have 4 lb. thrust; may be used with push-pull or rotary output. Servos will be set up to match systems as closely as possible and will have correct connectors attached. Slight adjustment may be needed for perfect neutral — full instructions are supplied. Feedback pots are essentially same as those in older Orbit PS-2 pots (but are smaller). Standard servos cost \$36.95; special 180 degree version for flap use, etc. are \$39.95. Good chance to update older digital rigs with modern, tiny servos. Many manufacturers do not offer small servos for old systems.

Five channel digital servo system from **F & M Electronics** (135 Vermont St., NE, Albuquerque, New Mexico 87108) is called the "Quasar." Offered both assembled and in kits on all R/C frequencies, it comes in single or dual-stick configurations. Transmitter measures 7 1/2 x 7 1/2 x 2 1/2" and has 550 mw output, a built-in charger and operates on 9.6V nickel-cadmium pack. Receiver weighs 2 1/2 oz., has simplified circuitry with all-silicon semi-conductors. Quasar servos utilize KEK Corp. mechanical parts with F & M amplifier; 2 oz. each, 3 1/2 lbs. thrust, 1/2" throw. All components designed for operating range of 0 to 140 degrees F. Complete outfit (with four servos) will cost about \$400; same system in kit form, \$219.95. Servo kits are approx. \$24.95 each.

**R & D Products** (Box 404, Paramus, N.J. 07652) appointed Eastern factory representatives for **Midwest Model Manufacturers**, stocks all-balsa ARF planes, including Lazy J, Mini Monk, Little Dove biplane. All are pre-assembled, ready for application of finish. Also in stock is Kwik-Flt III kit with strip ailerons, \$59.95.

One Finalist at Olathe Nats Pattern event talked **Pierre Marrot** out of a "Challenger" 11-8 prop and idle-bar glow plug of type used on French Champs' plane. He claimed they gave him 1500 more rpm, and his plane performed maneuvers better than ever. These items not distributed in this country yet, but those interested might contact French maker, **Challenger Products** (c/o Serge Straub, 14 Place des Victoires, 92 Asnières, France). Props are wood, usual variety of sizes. Glow plugs have standard threads to fit U.S. and most other engines, platinum element, inset idle bar.

Many new items in newest catalog from **Ace Radio Control** (203 W. 19th St., Higginsville, Mo. 64037). This 3rd 1968 printing includes all supplements to date, has 24 pages of general R/C info. Costs \$1. Coming soon from Ace, heavy-duty battery charger that has semiconductor circuitry to vary output; wider, smoother range of charging current, heat associated with internal rheostat will be absent.

For pulse rudder at lowest cost, Ace will market package, including Commander DE superhet, matching pulse transmitter, with Adams actuator and nickel-cad cells, completely wired ready to use, for around \$65. There also will be high-pulse-rate conversion for transmitter, high-pulse detector, an escapement, all packaged, allowing owner of system to add throttle control.



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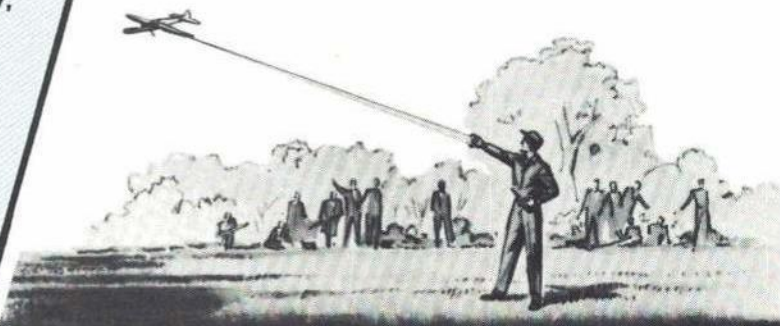
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\*Model Airplane News, May 1968

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